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GLOBAL DATA MONITORING REPORT

May 1999

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1. Introduction

As the WMO-appointed lead centre for monitoring surface marine data, the U.K. Meteorological Office produces monthly statistics on the quality of these observations received at RSMC Bracknell. This report includes this information along with statistics for most other types of data. The figures and tables contained herein are presented according to the agreed standards for the exchange of monitoring results.

The report is based on data received at the UK Meteorological Office Headquarters, Bracknell in time for inclusion into the appropriate analysis (the current cut-off time is approximately 7.2 hours after each analysis time). The evaluation of data quality is based on comparison with the appropriate 6-hour global model forecast (background field). Generally, the background field is of high quality except in data sparse areas, tropical regions and areas close to steep orography where care should be taken in interpreting the statistics shown.

Comments or queries on the report are welcome and should be addressed to:-

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2 Global Data Monitoring Statistics

Ships, Fixed buoys, Platforms and Drifting buoys observations

TABLES 1-2 contain lists of the stations which are considered to have returned suspect observations of pressure, windspeed, wind direction or temperature, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 1 and 2 show 10 degree lat/long box average numbers of SHIP/SYNOP and DRIFTER observations received per day throughout the month at Bracknell and assimilated into model runs. Only data from the main hours of 00 UTC, 06 UTC, 12UTC and 18 UTC are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Synop Observations

Table 3 contains a list of stations which are considered to have returned suspect observations of Pressure during the month. The criteria for quality control are given in the header page. The reporting practice of each station is included in the list of statistics.

At RSMC Bracknell, for synoptic stations at or below a height of 500 metres, reported mean sea-level pressure is used in the statistics. If this is unavailable the mean sea-level pressure is calculated from the reported station-level pressure and temperature.

For synoptic stations above 500 metres, the mean sea-level pressure is calculated from the reported station-level pressure and temperature, or, if these are not available the height of a standard pressure-level (e.g.: 850 hPa or 700 hPa). If neither of these are available, the reported mean sea-level pressure is used.

Some stations vary their reporting practice according to the observation hour (e.g.: some stations in the CIS report both mean sea-level and station-level pressure at 00 & 12 UTC, but only mean sea-level pressure at 06 & 18 UTC). For monitoring purposes, reported mean sea-level pressure is stored separately from that calculated from station-level pressure or height of a standard pressure-level. Only statistics for the preferred method (see above) are presented in this report, and so for certain high-level stations, such as those from the CIS, approximately half of the number of observations actually received will appear in the statistics.

Aircraft observations

TABLE 4 contains a list of statistics calculated from data received from all airline carriers.

Figure 3 shows 10 degree lat/long box average numbers of aircraft reports (in AIREP/AMDAR code, including AIREPs, ACARs, AMDARs and ASDARs) received per day throughout the month at Bracknell and assimilated into model runs in the layer 70-500 hPa. Observations with a vector wind difference (compared with the model background field) of >60 m s^{-1} have been excluded. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Figures 4-7 show wind statistics for AIREP/ASDAR (in AIREP/AMDAR code, including AIREPs, ACARs, AMDARs and ASDARs) in the layer 70-500 hPa. Observations with a vector wind difference > 60 m s^{-1} have been excluded. Statistics have not been calculated for 10 degree lat/long boxes containing <31 observations.

Figure	Parameter
4	Mean wind vectors
5	Mean observation - background wind vector
6	Mean observation-background speed (m s^{-1})
7	RMS observation-background vector (m s^{-1})

Radiosonde Observations

TABLES 5-7 contain lists of the stations which are considered to have returned suspect observations of geopotential height, vector wind or wind direction, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 8 and 9 show 10 degree lat/long box average numbers of TEMP 500 hPa GEOPOTENTIAL HEIGHT and TEMP/PILOT 300 hPa WIND observations received per day throughout the month at Bracknell and assimilated into model runs. Data from all hours are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

APPENDIX I shows details of the gross error limits used in TABLES 5 and 6 and the weights used in the RMS values in TABLE 5.

Satellite Observations

Figures 10-24 show satellite wind statistics for all geostationary satellites. All plots other than **AVAILABILITY** show average data where there are > 10 observations in a 10 degree lat/long box.

Figure	Parameter Plotted	Layer (hPa)
10	Availability/average daily number	701-1000
11	Vector mean wind (observed)	701-1000
12	Observation-background vector wind difference	701-1000
13	Mean observation-background speed differences	701-1000
14	RMS observation-background vector difference	701-1000
15	Availability/average daily number	401-700
16	Vector mean wind (observed)	401-700
17	Observation-background vector wind difference	401-700
18	Mean observation-background speed differences	401-700
19	RMS observation-background vector difference	401-700

Figure	Parameter Plotted	Layer (hPa)
20	Availability/average daily number	101-400
21	Vector mean wind (observed)	101-400
22	Observation-background vector wind difference	101-400
23	Mean observation-background speed differences	101-400
24	RMS observation-background vector difference	101-400

Figures 25-39 show sounding statistics from the polar orbitting satellite NOAA-15. Figure 25 shows the mean daily number of ATOVS soundings, and figures 26-39 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.
N.B. The sounding data is bias-corrected (and thinned) before being assimilated in the UKMO NWP model.

Figure		Weighting function peak (hPa)
26	Mean	Surface (HIRS8)
27	SD	Surface (HIRS8)
28	Mean	700 (HIRS15)
29	SD	700 (HIRS15)
30	Mean	500-700 (HIRS11)
31	SD	500-700 (HIRS11)
32	Mean	400 (HIRS4)
33	SD	400 (HIRS4)
34	Mean	700 (AMSUA5)
35	SD	700 (AMSUA5)
36	Mean	300 (AMSUA7)
37	SD	300 (AMSUA7)
38	Mean	100 (AMSUA9)
39	RMS	100 (AMSUA9)

3 Composite Observing Systems for the North Atlantic (COSNA)

This section shows statistics for upper air (radiosonde and aircraft) and surface (drifter) data for the North Atlantic area for data received at Bracknell during the month.

TABLE 8 shows quality statistics for **Mean Sea-level Pressure, Windspeed and Wind Direction** received at Bracknell in DRIFTER code during the month for the area 10°N - 80°N, 85°W - 0°W.

TABLE 9 shows quality statistics for **Temperature and Vector Wind** received at Bracknell from aircraft during the month for the area 40°N - 70°N, 60°W - 0°W.

Table 10 - 13 show quality statistics **(Geopotential Height and Windspeed at 100 and 500 hPa)** for all TEMPSHIPS in the area bounded by 0°N - 90°N, 100°W - 40°E and selected TEMP stations within the same area.

Revisions

1. May 95 Monitoring statistics for NOAA-11 removed. Figures 25-27 now show data for NOAA-12
2. May 95 Notes giving details of observations included in wind direction statistics clarified and corrected.
3. August 95 Monitoring statistics for NOAA-14 added with figures 28-30.
4. February 96 Monitoring statistics for GOES-7 have been replaced by statistics for GOES-8 and GOES-9.
5. April 96. 500 km and 120 km SATEMs replaced by 120 km resolution temperature profiles produced locally from the radiances disseminated by NESDIS.
6. February 97 Monitoring statistics for Meteosat 5 have been replaced by statistics for Meteosat 6.
7. Sept 97 Monitoring statistics for NOAA-12 removed. Figures 25-27 now show data for NOAA-11
8. January 1998. Increase in resolution of UKMO global forecast model.
9. April 1998. GOES winds ceased on 2nd March 1998, and were replaced with GOES high resolution winds from 15th.
10. June 1998. Monitoring statistics for Meteosat-6 were replaced by monitoring statistics for Meteosat-7, from 3rd June.
11. June 1998. Corrections in our processing of radiosonde data resulted in a decrease in the number of 500hPa geopotential heights in Figure 8 of about 230 per 24 hours (compared with previous reports), and a small increase in the number of 300hPa winds in Figure 9.
12. July 1998. Meteosat-5 began transmitting winds from 2nd July, at 63 degrees East (over the Indian ocean), and this data is included in the statistics.
13. July 1998. GOES-9 (at 135W) was replaced mid-month by GOES-10 (initially at 105W, moving towards 135W).
14. February 1999. Problems with NOAA-11, and TOVS data ceased to be assimilated from 26 February.
15. March 1999. UKMO introduced 3-D VAR assimilation system on 29 March, and also began assimilating ATOVS data from NOAA-15.
16. May 1999. Included statistics for ATOVS sounding data from NOAA-15.

TABLE 1

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SHIPS, FIXED BUOYS AND PLATFORMS
MONITORING CENTRE: BRACKNELL
MONTH: May 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for ships, fixed buoys and platforms.

Standard of comparison :Background field from UKMO global model.

Observation times :00, 06, 12, 18 UTC

Elements monitored :Mean sea level pressure (hPa).
:Wind speed ($m\ s^{-1}$).
:Wind direction (Degrees).

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. a positive bias indicates the observation is veered to the background.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT :15 hPa (pressure)
:25 $m\ s^{-1}$ (vector wind)

SELECTION CRITERIA :NOBS > 20 , and one or more of the following:

1.| bias|	> 4 hPa	(pressure),
	> 5 $m\ s^{-1}$	(wind speed),
	> 30 degrees	(direction).
2.SD	> 6 hPa	(pressure),
	> 80 degrees	(direction).
3.PGE	> 25	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 $m\ s^{-1}$

IDENTIFIER	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
AGRF	ALL	P	SUR	32	0	0	0.7	4.0	4.0
C6ON5	ALL	P	SUR	31	0	0	0.9	-5.1	5.1
ELTE6	ALL	P	SUR	25	0	0	1.3	-4.1	4.3
ELVI2	ALL	P	SUR	49	0	0	1.7	-4.8	5.1
LAXP4	ALL	P	SUR	43	0	0	2.5	-4.0	4.7
PCBU	ALL	P	SUR	23	0	0	0.9	10.6	10.6
UBDO	ALL	P	SUR	26	0	0	5.1	7.4	9.0
UCUD	ALL	P	SUR	34	3	9	7.2	0.9	7.2
UDUE	ALL	P	SUR	22	1	5	2.6	11.4	11.7
UDYG	ALL	P	SUR	37	0	0	2.6	-4.7	5.3
UDYN	ALL	P	SUR	38	1	3	3.4	4.9	6.0
VVGG	ALL	P	SUR	28	0	0	1.9	4.5	4.9
VYNG	ALL	P	SUR	40	35	88	0.6	2.7	2.7
WDZG	ALL	P	SUR	60	0	0	2.0	-4.6	5.0
ZCAM9	ALL	P	SUR	42	0	0	1.7	8.3	8.5
3ECI8	ALL	P	SUR	75	0	0	0.8	-5.3	5.3
3FFG7	ALL	P	SUR	23	0	0	1.2	-4.1	4.2
3FGQ3	ALL	P	SUR	57	0	0	1.2	8.4	8.5
48102	ALL	P	SUR	492	129	26	1.2	-0.1	1.2
48111	ALL	P	SUR	645	311	48	1.3	0.3	1.4
62138	ALL	P	SUR	91	0	0	2.1	7.1	7.4
WIND SPEED									
C6KE3	ALL	SPEED	SUR	26	0	0	4.9	5.1	7.0
C6KF8	ALL	SPEED	SUR	120	0	0	4.7	8.0	9.3
C6LQ3	ALL	SPEED	SUR	21	0	0	5.5	6.9	8.8
C6QD2	ALL	SPEED	SUR	64	0	0	5.6	5.3	7.7
DUQM	ALL	SPEED	SUR	27	0	0	5.2	7.1	8.8
DUXW	ALL	SPEED	SUR	36	0	0	3.4	7.7	8.4
FNIK	ALL	SPEED	SUR	112	0	0	6.3	6.1	8.7
FNZQ	ALL	SPEED	SUR	67	0	0	6.0	7.3	9.5
KGTZ	ALL	SPEED	SUR	34	0	0	3.4	5.2	6.2
MWBJ9	ALL	SPEED	SUR	43	0	0	4.9	6.8	8.4
MXHR6	ALL	SPEED	SUR	24	0	0	6.7	8.8	11.1
PCCY	ALL	SPEED	SUR	32	0	0	4.0	6.1	7.3
PGDC	ALL	SPEED	SUR	31	0	0	4.7	5.9	7.5
P3KZ7	ALL	SPEED	SUR	27	0	0	5.2	11.3	12.4
SYMK	ALL	SPEED	SUR	36	0	0	2.2	5.2	5.6
VRUM3	ALL	SPEED	SUR	38	0	0	5.5	5.9	8.0
VRUZ7	ALL	SPEED	SUR	23	0	0	3.8	9.6	10.3
VRVD6	ALL	SPEED	SUR	40	0	0	5.3	6.7	8.6
VSBT9	ALL	SPEED	SUR	87	0	0	6.0	6.0	8.5
3FTW	ALL	SPEED	SUR	32	0	0	4.6	5.3	7.0
62105	ALL	SPEED	SUR	619	0	0	3.9	-5.9	7.1
WIND DIRECTION									
C6KF8	ALL	DIRN.	SUR	51	0	0	50.5	-47.4	69.2
DACF	ALL	DIRN.	SUR	134	0	0	97.6	81.9	127.4
DBBX	ALL	DIRN.	SUR	74	0	0	36.6	-75.8	84.2
DGDD	ALL	DIRN.	SUR	20	0	0	40.7	37.8	55.5
VRUM3	ALL	DIRN.	SUR	27	0	0	62.8	34.0	71.4

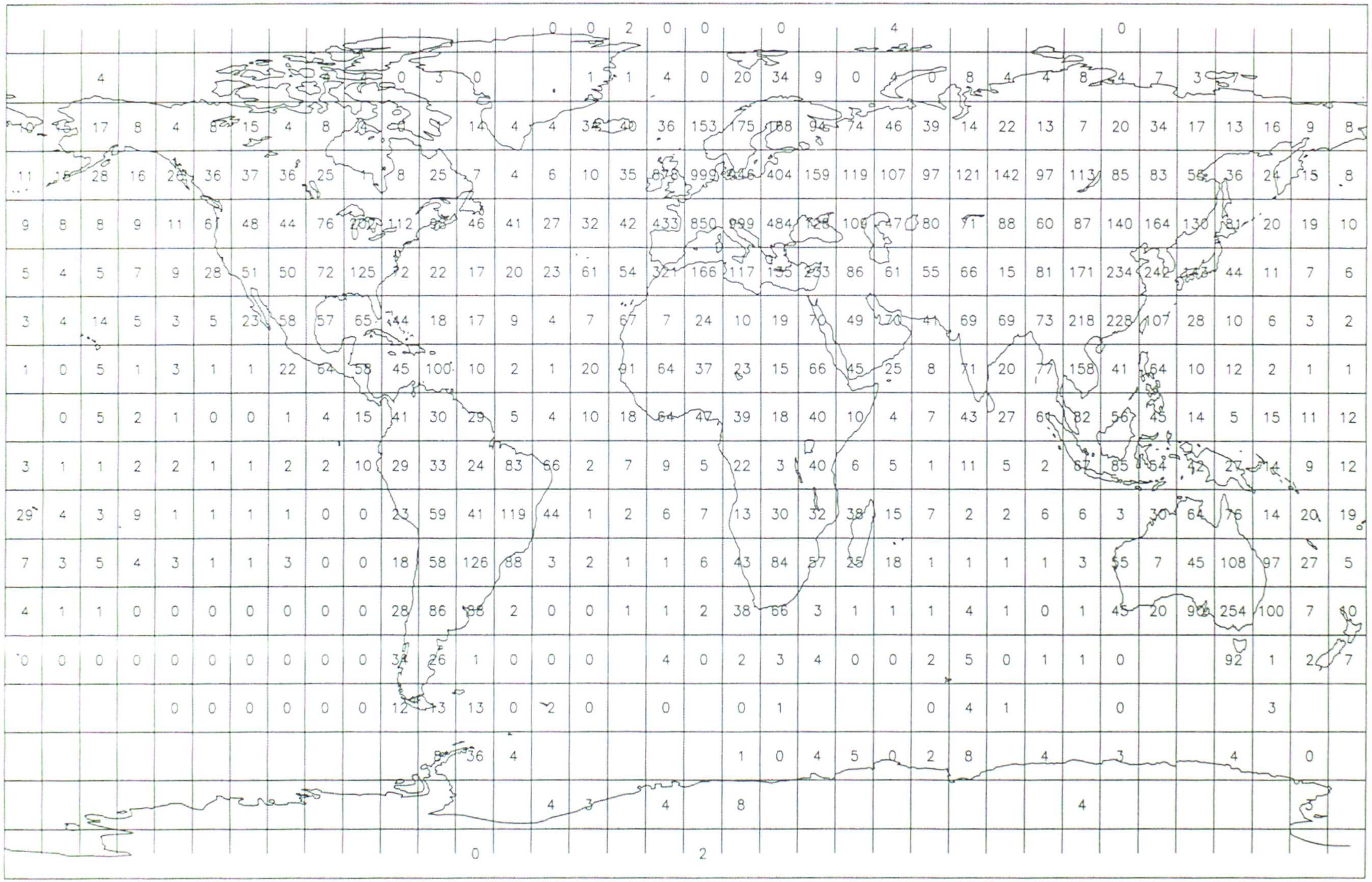
AVAILABILITY – SHIP/SYNOP – MAY 1999

FIGURE 1

MAIN HOURS ONLY

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS = 21249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4 4 0 3 0 1 1 4 0 20 34 9 0 4 0 8 4 4 8 24 7 3
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11 16 28 16 26 36 37 36 25 1 8 25 7 4 6 10 35 878 999 446 404 159 119 107 97 121 142 97 113 85 83 56 36 24 15 8
9 8 8 9 11 61 48 44 76 202 112 83 46 41 27 32 42 433 850 999 484 128 109 47 80 71 88 60 87 140 164 130 81 20 19 10
5 4 5 7 9 28 51 50 72 125 72 22 17 20 23 61 54 321 166 117 135 233 86 61 55 66 15 81 171 234 242 143 44 11 7 6
3 4 14 5 3 5 23 58 57 65 44 18 17 9 4 7 67 7 24 10 19 70 49 170 41 69 69 73 218 228 107 28 10 6 3 2
1 0 5 1 3 1 1 22 64 58 45 100 10 2 1 20 91 64 37 23 15 66 45 25 8 71 20 77 158 41 64 10 12 2 1 1
0 5 2 1 0 0 1 4 15 41 30 29 5 4 10 18 64 47 39 18 40 10 4 7 43 27 61 82 56 45 14 5 15 11 12
3 1 1 2 2 1 1 2 2 10 29 33 24 83 66 2 7 9 5 22 3 40 6 5 1 11 5 2 67 85 54 42 27 14 9 12
29 4 3 9 1 1 1 1 0 0 23 59 41 119 44 1 2 6 7 13 30 32 38 15 7 2 2 6 6 3 30 64 76 14 20 19
7 3 5 4 3 1 1 3 0 0 18 58 126 88 3 2 1 1 6 43 84 57 25 18 1 1 1 1 3 55 7 45 108 97 27 5
4 1 1 0 0 0 0 0 0 0 28 86 88 2 0 0 1 1 2 38 66 3 1 1 1 4 1 0 1 45 20 90 254 100 7 10
0 0 0 0 0 0 0 0 0 0 34 26 1 0 0 0 4 0 2 3 4 0 0 2 5 0 1 1 0 92 1 2 7
0 0 0 0 0 0 12 13 13 0 2 0 0 0 1 0 4 1 0 3
36 4 1 0 4 5 0 2 8 4 3 4 0
4 3 4 8 4
0 2

TABLE 2

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - DRIFTING BUOYS
MONITORING CENTRE: BRACKNELL
MONTH: May 1999

Monitoring procedures

Period	:One calendar month.
Data monitored	:Reports from each unique identifier for drifting buoys.
Standard of comparison	:Background field from UKMO global model.
Position	:Average latitude and longitude for period.
Observation times	:00, 06, 12, 18 UTC
Elements monitored	:Mean sea level pressure (hPa). :Wind speed (m s^{-1}). :Wind direction (degrees).

Parameters monitored

	:NOBS	:Number of observations received excluding duplicates.
	:NGE	:Number of observations with gross errors.
	:PGE	:Percentage of observations with gross errors.
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors. **N.B. a positive bias indicates the observation is veered to the background.**
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT	:15 hPa	(pressure)	
	:25 m s^{-1}	(vector wind)	
SELECTION CRITERIA :	NOBS	≥ 20 , and one or more of the following:	
	1.| bias|	> 4 hPa	(pressure),
		> 5 m s^{-1}	(wind speed),
		> 30 degrees	(direction).
	2.SD	> 6 hPa	(pressure),
		> 80 degrees	(direction).
	3.PGE	> 25.	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE											
46510	44.7	-63.6	ALL	P	SUR	23	0	0	0.8	-5.9	5.9
54905	-35.1	-156.3	ALL	P	SUR	126	9	7	5.1	-4.0	6.5
56529	-29.5	71.3	ALL	P	SUR	94	3	3	5.0	-4.1	6.4
62503	46.2	-19.9	ALL	P	SUR	92	0	0	4.0	4.5	6.0
62504	47.1	-15.0	ALL	P	SUR	33	0	0	2.4	5.0	5.5
65592	61.9	-20.6	ALL	P	SUR	339	84	25	8.0	-2.8	8.4
WIND SPEED											
21531	37.1	-146.5	ALL	SPEED	SUR	108	0	0	2.5	-6.4	6.9
46632	55.7	-153.8	ALL	SPEED	SUR	253	0	0	3.1	-5.8	6.6
WIND DIRECTION											
46551	39.0	-141.0	ALL	DIRN.	SUR	24	0	0	24.7	33.1	41.3
46632	55.7	-153.8	ALL	DIRN.	SUR	67	0	0	38.8	36.2	53.0
55587	-41.6	169.6	ALL	DIRN.	SUR	438	0	0	17.4	42.1	45.6

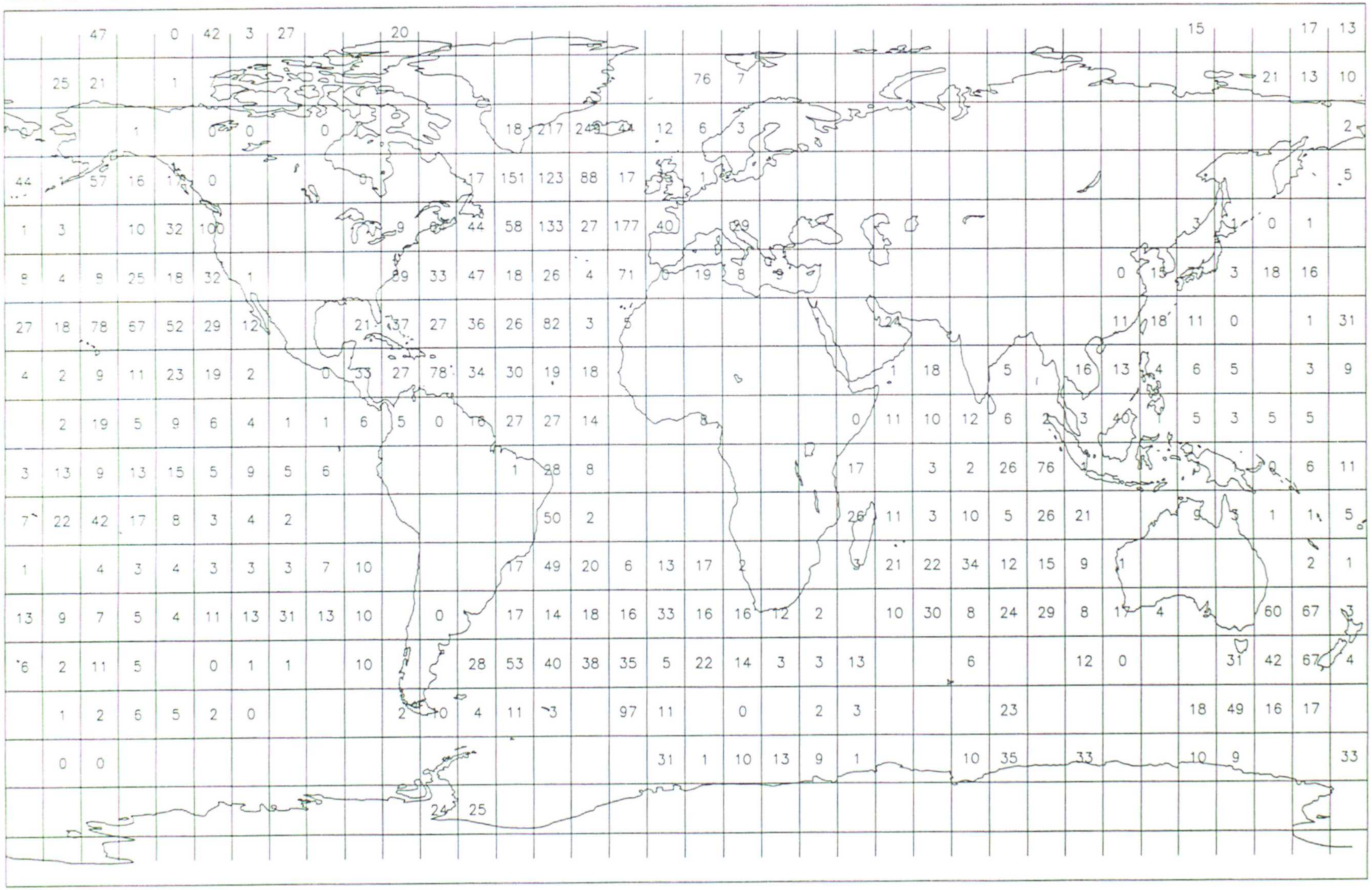
AVAILABILITY – DRIFTER – MAY 1999

FIGURE 2

MAIN HOURS ONLY

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS = 6318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25 21 1 76 7 21 13 10
0 1 0 0 0 18 217 249 44 12 6 3 2
44 1 57 16 17 0 0 17 151 123 88 17 39 1 5
1 3 10 32 100 9 8 44 58 133 27 177 40 29 3 1 0 1
9 4 8 25 18 32 1 39 33 47 18 26 4 71 0 19 8 9 0 15 3 18 16
27 18 78 57 52 29 12 21 37 27 36 26 82 3 5 24 11 18 11 0 1 31
4 2 9 11 23 19 2 0 33 27 78 34 30 19 18 1 18 5 16 13 4 6 5 3 9
2 19 5 9 6 4 1 1 6 5 0 16 27 27 14 8 0 11 10 12 6 2 3 40 1 5 3 5 5
3 13 9 13 15 5 9 5 6 1 28 8 17 3 2 26 76 1 0 6 11
7 22 42 17 8 3 4 2 50 2 26 11 3 10 5 26 21 9 3 1 1 5
1 4 3 4 3 3 3 7 10 17 49 20 6 13 17 2 3 21 22 34 12 15 9 1 2 1
13 9 7 5 4 11 13 31 13 10 0 17 14 18 16 33 16 16 12 2 10 30 8 24 29 8 17 4 60 67 3
6 2 11 5 0 1 1 10 28 53 40 38 35 5 22 14 3 3 13 6 12 0 31 42 67 4
1 2 6 5 2 0 2 10 4 11 3 97 11 0 2 3 23 18 49 16 17
0 0 31 1 10 13 9 1 10 35 33 10 9 33
24 25

TABLE 3

MONITORING OF LAND SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SYNOPS & AUTOSYNOPS
MONITORING CENTRE: BRACKNELL
MONTH: May 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for synops & autosynops.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00, 06, 12, 18 UTC
Elements monitored		:Mean sea level pressure (hPa).
Parameters monitored	:HT(m)	:Station height (in metres) as given in WMO No. 9 Vol A
	:RP	:Pressure reporting practice M=mean sea level pressure (hPa) reported. S=Station level pressure reported. 8=Geopotential height (m) of 850 hPa surface reported. 7=Geopotential height (m) of 700 hPa surface reported.
	:NOBS	:Number of observations received excluding duplicates.
	:NGE	:Number of observations with gross errors.
	:PGE	:Percentage of observations with gross errors.
	:%REJ	:Percentage of observations flagged excluding those with gross errors.
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.
GROSS ERROR LIMIT	:15 hPa	(pressure)
SELECTION CRITERIA	:NOBS	> 20 ,and one or more of the following:
	1.| bias|	> 4 hPa
	2. SD	> 6 hPa
	3.PGE	> 25.

N.B. For stn ht > 500m, mslp is that calculated from station level pressure where available.
For stn ht < 500m, mslp is that as reported by the station where available.

WMO REGION 1:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
60010	28.3N	16.5W	2367	S7	84	0	0	85	1.5	-5.4	5.6
60445	36.2N	5.4E	1081	S8	111	1	1	0	0.8	4.4	4.5
60468	35.6N	6.2E	1052	S8	107	107	100	0			
60511	35.3N	1.4E	1127	S8	111	56	50	0	2.1	13.8	14.0
60535	34.7N	3.3E	1144	S8	84	0	0	0	0.7	-6.2	6.2
60670	24.6N	9.5E	1054	S8	97	0	0	0	0.7	9.6	9.6
63330	13.5N	39.5E	2070	MS	55	55	100	0			
63334	10.3N	37.7E	2515	MS	75	0	0	0	1.2	10.3	10.4
63402	7.7N	36.8E	1725	MS	90	0	0	46	1.2	5.0	5.1
63450	9.0N	38.8E	2354	MS	107	2	2	0	0.7	4.2	4.3
63453	8.9N	39.9E	930	S	87	0	0	14	1.2	-4.1	4.3
63471	9.6N	41.9E	1260	MS	95	1	1	0	0.9	9.2	9.2
63478	5.9N	43.6E	295	MS	65	0	0	0	1.1	7.0	7.1
68016	19.3S	12.7E	16	M	61	15	25	0	1.2	2.0	2.3
68030	18.5S	25.6E	1071	8	20	0	0	20	0.8	4.2	4.3
68350	26.7S	27.1E	1351	S8	118	0	0	0	1.9	9.8	10.0
68396	26.5S	31.3E	641	S8	53	0	0	2	1.8	4.5	4.8

WMO REGION 2:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
30320	56.9N	105.7E	669	MS	116	58	50	0	2.5	0.3	2.5
38069	44.2N	66.8E	153	M	110	0	0	35	1.1	-5.2	5.3
40743	36.2N	57.7E	941	MS	107	0	0	0	1.2	-6.3	6.4
40762	35.3N	59.2E	1333	MS	105	31	30	0	1.0	-13.5	13.5
41254	23.1N	57.7E	1755	S8	76	76	100	0			
41396	16.0N	48.9E	700	MS	39	1	3	0	0.7	6.3	6.3
41535	34.2N	73.3E	1308	8	45	0	0	7	2.2	-5.1	5.6
44416	28.6N	81.6E	720	MS	59	2	3	0	2.3	4.3	4.9
44477	27.0N	87.4E	1445	S8	57	56	98	0	0.0	-10.9	10.9
47022	40.8N	128.2E	1200	S	39	1	3	0	0.9	4.5	4.6
51495	43.5N	91.6E	874	M	121	0	0	0	1.4	7.1	7.2
52602	38.8N	93.4E	2734	S	121	0	0	0	1.0	-5.1	5.2
52866	36.6N	101.8E	2262	S	121	0	0	0	1.2	-4.5	4.7
52955	35.6N	100.8E	3201	S	120	0	0	0	0.9	11.2	11.2
53588	39.0N	113.5E	2898	S	121	121	100	0			
54587	39.1N	123.2E	-61	M	86	0	0	3	1.5	-4.5	4.7
56144	31.8N	98.6E	3184	S	113	1	1	0	1.4	-5.7	5.9
56385	29.5N	103.3E	3049	S	121	0	0	26	1.4	-4.5	4.7
56444	28.5N	98.9E	3488	S	117	8	7	0	0.5	13.9	13.9
56462	29.0N	101.5E	2994	S	120	1	1	1	1.3	7.7	7.8

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
80099	7.1N	70.7W	128	MS	28	0	0	0	1.1	-5.7	5.8
80416	10.5N	66.9W	835	S8	27	8	30	11	1.0	2.1	2.3
82336	3.1S	58.4W	40	MS	84	0	0	8	2.1	-5.7	6.1
82704	7.6S	72.7W	170	MS	82	0	0	0	1.2	-4.0	4.2
83214	10.3S	54.9W	285	MS	61	1	2	0	1.3	-6.8	6.9
83235	12.4S	46.4W	604	MS	81	0	0	1	1.1	5.8	5.9
83319	14.7S	52.4W	315	MS	82	0	0	0	1.0	-5.1	5.2
83332	14.1S	46.4W	826	MS	83	3	4	2	1.4	13.0	13.1
83376	15.9S	49.0W	740	MS	83	0	0	78	0.8	-4.0	4.1
83408	14.3S	43.8W	447	MS	83	0	0	0	0.7	9.8	9.8
83423	16.7S	49.3W	741	MS	83	0	0	0	0.7	-5.1	5.1
83488	17.8S	42.9W	1097	MS	81	81	100	0			
83531	18.6S	46.5W	940	MS	83	0	0	0	0.9	-7.1	7.2
83587	19.9S	43.9W	850	MS	81	1	1	2	1.3	-6.5	6.6
83773	23.1S	48.9W	793	S	43	0	0	0	1.0	-5.6	5.7

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
83836	25.5S	50.6W	837	MS	85	0	0	2	1.2	-4.9	5.0
84401	5.2S	80.6W	49	MS	66	0	0	0	1.1	5.0	5.1
84425	5.9S	76.1W	179	MS	45	0	0	2	1.1	4.2	4.3
84455	6.5S	76.4W	281	MS	51	0	0	2	1.3	5.5	5.7
84472	7.1S	78.5W	2620	S	38	1	3	3	0.7	-6.3	6.3
84686	13.6S	72.0W	3248	S	71	0	0	0	0.9	-5.8	5.9
84782	18.1S	70.3W	468	MS	75	0	0	0	1.1	8.5	8.6
85312	19.8S	63.9W	992	S	44	3	7	48	1.4	-11.0	11.1
85406	18.3S	70.3W	55	M	118	0	0	1	1.1	5.4	5.5
85432	22.5S	68.9W	2320	S8	80	0	0	0	0.8	4.0	4.1
85836	43.6S	71.8W	277	M	40	0	0	0	2.4	5.8	6.3

WMO REGION 4:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
76118	30.4N	109.7W	1040	MS	34	0	0	0	0.5	-10.2	10.2
76632	20.1N	98.7W	2417	MS	31	1	3	0	0.7	-5.1	5.1
76658	19.2N	103.7W	494	MS	33	0	0	0	0.8	7.0	7.0
76750	18.5N	88.3W	9	MS	79	0	0	0	1.2	-7.7	7.8
76775	17.1N	96.7W	1550	MS	52	1	2	0	0.9	4.4	4.5
76845	16.7N	92.6W	2276	MS	72	72	100	0			
78718	14.4N	87.6W	626	MS	64	49	77	0	0.7	-14.5	14.5

WMO REGION 5:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
91163	21.9N	159.6W	7	8	359	359	100	0			
94328	22.4S	133.6E	623	MS	116	0	0	0	0.6	6.3	6.3
94955	41.6S	145.7E	684	MS	114	114	100	0			
95909	36.5S	148.3E	1957	S	118	118	100	0			
95952	41.9S	145.6E	560	MS	116	116	100	0			
96505	3.7N	115.7E	911	S8	23	18	78	0	1.3	0.8	1.5
96751	6.7S	106.9E	925	S8	74	72	97	0	1.4	-0.9	1.7

WMO REGION 6:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
01360	61.9N	7.9E	712	MS	120	0	0	0	0.9	5.9	6.0
04207	81.7N	59.9W	105	MS	83	0	0	0	0.9	-4.3	4.4
16227	41.9N	13.6E	655	MS	188	188	100	16			
16614	40.4N	21.3E	604	MS	103	0	0	0	1.0	-6.5	6.6
17092	39.8N	39.5E	1218	S8	121	0	0	0	1.3	7.5	7.6
17203	38.9N	40.5E	1177	S8	107	0	0	0	1.1	4.2	4.3

ANTARCTIC:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
89272	75.0S	70.8W	1395	S	237	85	36	0	2.3	-11.6	11.8
89744	74.0S	43.0E	3353	S	255	0	0	0	1.6	4.9	5.2

TABLE 4

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: May 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Statistics for each airline carrier.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:All hours combined.
Level(s) monitored		:70.0 - 500.0 hPa
Elements monitored		:TEMP in °C ; WIND in $m\ s^{-1}$
Parameters monitored	:N REP.	:Number of observations received excluding duplicates.
	:PG	:Percentage of observations with gross errors.
	:PR	:Percentage of observations rejected by quality control including rejections from the duplicate check.
	:PC	:Percentage of observations with calm winds.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.
GROSS ERROR LIMITS		:10.0 °C ; 60 $m\ s^{-1}$ Vector Wind
SELECTION CRITERIA		:N REP > 20

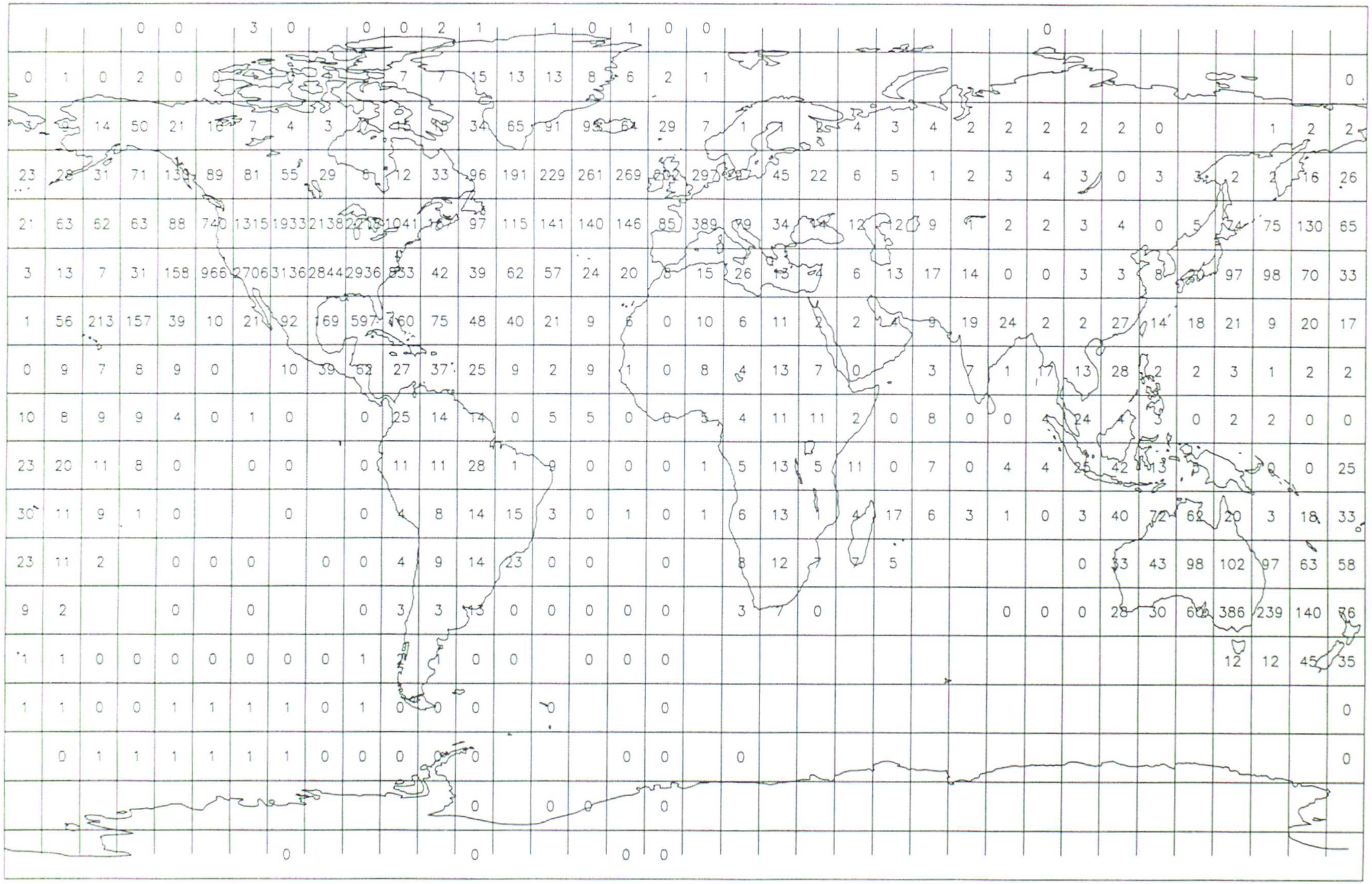
NB: US ACARs and ADS data are shown at the bottom of the table as US ACAR and ADS respectively.

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAA	51	0	25	1.9	1.4	52	0	25	0	6.2	2.4
AAH	72	0	6	1.3	0.3	80	0	9	0	7.5	1.8
AAL	5567	0	18	1.6	0.1	5527	0	18	0	8.3	1.2
AAR	1348	0	7	1.8	-0.5	1355	0	8	0	9.0	0.5
ACA	2006	1	7	1.7	-0.1	2016	0	6	0	6.7	1.0
ACI	40	0	38	1.3	0.7	40	0	38	0	8.2	3.4
AEA	555	1	5	1.9	0.1	493	0	5	0	8.2	0.8
AEL	434	1	14	2.7	1.1	438	0	12	0	8.5	0.7
AEY	79	0	4	1.4	0.7	77	0	8	0	9.8	-0.2
AFL	594	1	4	1.8	0.5	593	0	4	0	7.1	1.2
AFR	1886	0	10	1.9	0.1	1918	0	10	0	7.8	0.8
AIH	134	0	7	1.7	0.6	133	0	7	0	7.6	1.0
AJM	84	2	4	1.6	-1.1	84	0	0	0	6.6	1.0
AMM	121	1	6	1.7	0.4	120	0	9	0	9.7	0.4
AMT	565	1	33	1.4	0.9	567	0	33	0	6.4	0.8
AMX	380	2	6	1.9	0.0	377	0	6	0	9.2	1.3
ANA	1407	0	5	1.8	-0.1	1403	0	6	0	8.5	0.7
ANO	26	0	0	0.8	-0.2	26	0	0	0	6.8	0.6
ANQ	34	0	0	1.2	0.0	34	0	0	0	7.3	-1.2
ANZ	4321	1	39	1.8	0.2	4261	0	39	0	8.4	0.7
AOM	904	0	8	1.9	0.8	902	0	9	0	8.2	0.5
ARG	21	10	24	4.7	-0.2	23	0	4	0	10.4	2.3
AUA	29	3	7	1.6	-0.6	29	0	3	0	6.3	1.5
AVA	500	1	4	1.7	-0.2	503	0	4	0	8.4	1.2
AVE	195	1	6	1.6	0.7	193	1	7	0	8.9	1.2
AVN	56	4	4	1.6	1.1	56	0	0	0	6.6	-0.4
AXF	93	3	40	1.3	0.4	89	0	42	0	11.7	1.1
AZA	472	2	13	2.4	0.3	471	0	12	0	8.5	0.9
BAL	477	0	14	1.6	-0.5	482	0	14	0	7.0	0.3
BAW	2013	0	11	1.9	-0.3	2031	0	12	0	7.5	0.9
BBB	20	0	0	1.0	-0.3	21	0	0	0	4.3	0.8
BLX	54	2	6	1.5	-0.3	53	0	6	0	5.7	0.7
BWA	402	0	6	2.1	1.6	395	0	7	0	8.7	0.6
CAL	1401	1	6	1.8	0.1	1394	1	7	0	8.4	0.7
CCA	237	1	100	2.3	0.7	271	0	100	0	14.4	-0.5
CDN	2364	1	9	1.9	0.3	2365	0	9	0	8.3	0.7
CES	319	1	6	1.7	0.5	314	1	100	0	9.7	0.1
CFC	24	0	8	2.5	0.3	24	0	8	0	6.5	1.7
CFG	1094	1	4	1.8	-0.4	1086	0	5	0	7.7	0.1
CKS	383	1	30	1.3	0.4	415	0	32	0	6.6	1.0
CKT	302	1	8	1.9	1.0	277	0	9	0	6.8	0.2
CLX	467	1	7	1.7	-0.2	468	1	8	0	7.6	0.6
CMI	461	1	5	1.5	0.7	462	0	4	0	8.7	0.8
CMM	611	0	6	1.6	0.3	610	0	7	0	6.2	0.9
COA	1535	0	18	1.6	0.1	1522	0	20	0	10.7	2.0
CPA	105	1	2	1.7	-0.2	106	0	1	0	6.9	-0.1
CRL	560	1	6	1.6	0.4	565	0	6	0	6.8	0.8
CSA	26	0	4	2.5	-0.3	26	0	4	0	8.7	0.0
CSN	90	0	4	1.4	0.2	91	1	7	0	7.9	1.3
CTB	205	1	2	1.8	-0.2	203	0	2	0	7.4	0.6
CTM	55	5	22	2.4	-0.3	53	0	13	0	6.8	1.4
CUB	487	0	7	2.0	0.8	482	0	7	0	8.8	0.7
DAL	4169	0	28	1.8	0.3	4186	0	28	0	7.7	0.8
DBY	859	0	3	1.5	-0.5	861	0	4	0	7.3	0.4
DLH	3757	0	9	1.8	-0.1	3734	0	9	0	7.1	0.8
EEZ	33	0	21	1.2	-0.5	33	0	24	0	11.1	-1.2
EIA	368	0	26	2.4	1.0	362	0	27	0	10.9	0.8
ELY	146	1	7	1.4	-0.2	156	0	6	0	5.7	0.8
EVA	2029	0	4	1.5	-0.2	2045	0	5	0	8.3	0.2

		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
EWW	88	1	18	2.3	-0.2	89	0	15	0	8.3	2.2
FDX	1560	1	16	1.7	0.4	1565	0	16	0	8.2	0.8
FIN	379	0	11	1.9	0.2	371	0	13	0	8.8	1.1
FJI	1039	2	29	1.7	0.9	1025	1	28	0	8.9	1.1
FOM	223	4	42	1.7	-0.1	212	0	39	0	7.3	-0.2
GAF	53	0	4	1.9	-1.2	53	0	6	0	6.4	1.4
GCO	20	0	0	2.2	1.2	24	0	8	0	9.2	1.4
GHA	65	0	0	1.3	0.2	63	0	2	0	9.2	2.8
GIA	46	2	20	2.1	0.7	46	0	15	0	6.2	1.4
GRL	40	0	0	1.3	0.0	37	0	0	0	5.3	0.4
GTI	75	3	24	2.6	0.9	83	0	22	0	8.3	1.0
HAL	3104	0	30	1.4	0.3	3046	0	31	0	9.0	1.6
HLF	111	0	4	2.0	-0.7	106	0	6	0	7.6	-0.1
HRH	143	3	55	1.6	0.1	139	0	54	0	9.2	-0.1
IBE	3231	1	17	2.0	0.4	3209	0	18	0	8.8	1.1
ICE	1145	0	6	1.7	0.1	1128	0	7	0	7.9	1.2
IWD	173	1	6	1.7	-0.4	171	1	4	0	7.8	1.0
JAL	7013	0	4	1.8	0.2	6999	0	5	0	8.2	0.8
JAZ	27	22	22	1.9	1.0	27	0	4	0	8.8	2.0
JKK	248	1	10	1.6	0.2	214	0	12	0	9.1	1.4
KAI	32	0	34	2.4	0.4	29	0	31	0	6.8	-0.8
KAL	3804	1	9	1.9	-0.1	3790	0	10	0	9.1	0.6
KIW	38	5	37	4.8	4.1	37	0	27	0	10.0	1.5
KLM	3255	0	15	1.7	0.2	3261	0	15	0	7.5	0.9
KSV	127	2	31	2.3	-0.4	132	0	32	0	8.8	0.7
LAN	53	13	26	3.8	0.6	55	0	9	0	9.5	1.3
LAP	40	0	10	2.1	0.5	40	0	20	0	13.5	3.8
LDA	102	0	10	1.8	0.1	103	0	12	0	9.7	0.0
LDI	458	1	10	1.8	-0.4	452	0	10	0	7.2	0.7
LGL	37	5	8	1.9	-1.3	37	0	3	0	4.8	-0.3
LIB	449	1	4	2.0	1.1	450	0	4	0	7.4	0.6
LOT	332	1	12	2.0	-1.1	329	0	13	0	8.7	0.9
LTU	767	0	8	1.7	-0.3	755	0	8	0	7.3	0.6
MAS	441	1	10	1.6	0.1	458	0	10	0	9.3	0.9
MDA	80	1	1	1.9	-0.8	80	0	3	0	8.3	0.3
MON	213	0	8	1.7	-0.2	212	1	8	0	8.3	1.2
MPD	317	0	3	2.0	0.8	311	0	3	0	7.7	0.7
MPH	1003	1	5	1.8	-0.6	1003	0	5	0	7.9	0.4
NCA	620	0	3	1.7	0.2	616	0	4	0	8.0	1.0
NWA	10726	0	10	1.9	0.7	10456	0	9	0	7.7	0.7
PAC	212	1	13	2.4	0.8	215	0	13	0	9.3	1.5
PAL	1035	0	5	1.4	-0.3	998	0	6	0	7.7	0.4
PAO	296	2	40	1.2	0.3	296	0	41	0	10.3	1.0
PAQ	37	3	11	1.4	-0.7	38	0	11	0	10.9	-1.2
QFA	2194	1	50	1.9	0.4	2165	0	50	0	8.5	0.3
RAF	90	0	2	1.9	1.3	87	0	6	0	8.1	1.3
RAM	96	0	7	2.0	-0.2	95	1	7	0	8.9	1.7
RCH	510	2	16	2.2	0.6	493	0	100	0	9.3	2.5
RJA	27	0	4	2.1	0.6	27	0	7	0	12.8	0.0
RKA	108	1	3	1.7	-0.5	108	0	1	0	6.6	1.6
ROY	139	1	11	1.6	-0.5	139	0	12	0	9.9	0.9
RRR	46	0	26	1.6	-0.2	50	0	28	0	8.9	1.1
RYN	460	0	36	1.3	0.9	464	0	37	0	5.5	0.5
RZO	105	2	2	1.8	0.2	105	0	1	0	8.8	1.8
SAA	313	1	3	1.8	0.2	311	0	2	0	6.9	0.6
SAB	55	0	7	1.3	0.0	57	0	7	0	6.9	0.9
SAS	1801	0	1	1.7	-0.3	1785	0	2	0	6.4	0.7
SEU	46	2	4	2.3	2.0	44	0	5	0	6.5	-0.4
SIA	937	0	9	1.7	-0.1	935	0	9	0	7.7	0.7

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
SLR	197	1	10	1.3	-0.5	197	0	11	0	7.7	0.8
SOL	55	0	2	1.6	1.2	55	0	4	0	8.7	-0.1
SVA	94	0	5	1.7	-0.4	95	0	6	0	7.3	0.5
SVV	31	0	16	4.8	3.2	31	3	10	0	12.3	-3.2
SWR	115	1	8	1.8	0.0	116	0	9	0	7.6	0.4
TAP	758	1	8	1.8	-0.4	755	0	9	0	8.3	1.5
TBA	51	6	25	3.0	1.7	51	2	31	0	13.5	1.1
TCO	25	0	0	1.8	-0.6	25	0	0	0	6.4	1.1
THA	506	0	5	1.8	-0.3	501	1	6	0	7.7	0.7
THT	76	1	26	1.8	1.3	76	1	25	0	8.6	1.2
TOW	75	0	7	2.0	0.3	80	0	13	0	10.9	1.0
TSC	97	0	12	1.9	0.0	103	0	11	0	8.2	1.7
TWA	1536	0	16	1.8	0.1	1492	0	15	0	8.1	1.0
UAL	98803	1	86	1.5	0.0	98703	0	86	0	6.5	0.8
UPS	1402	1	28	1.7	0.4	1409	0	27	0	7.2	0.7
USA	301	1	7	1.7	-0.3	250	0	7	0	7.1	1.1
VHC	20	0	25	2.7	2.4	20	0	25	0	8.1	1.9
VIR	471	1	7	1.7	-0.3	465	0	8	0	7.9	0.5
VKG	66	0	2	1.8	0.6	65	0	5	0	10.5	0.6
VRG	304	2	16	2.5	1.0	308	0	100	0	11.0	0.0
VSP	57	2	23	2.8	1.2	55	0	18	0	10.9	-0.6
VVR	64	3	33	2.4	0.2	64	0	28	0	7.1	1.0
WOA	152	4	8	2.3	1.1	154	0	5	0	9.8	1.2
ZKN	2786	0	5	1.7	-0.1	2786	0	5	0	8.9	0.3
AN	23091	0	1	1.6	0.3	23091	0	1	0	6.6	0.7
AR	3716	0	100	2.8	2.5	3714	0	1	0	6.3	0.8
BA	33462	0	1	1.4	0.2	33404	0	1	0	5.8	0.8
IT	388	0	52	1.2	0.4	387	0	53	0	9.2	3.2
KL	9664	0	4	1.7	1.1	9649	0	4	0	5.7	0.6
LH	64	0	0	2.5	1.6	155	0	12	0	9.7	1.5
MK	5090	0	63	2.3	1.8	5080	0	1	0	7.1	0.9
OZ	39	0	44	1.7	-0.3	39	5	46	0	6.9	0.0
QF	24565	0	4	1.5	0.7	24559	0	4	0	6.4	0.9
QG	32	0	0	1.8	1.2	32	0	0	0	6.5	1.4
SA	3815	0	0	2.4	2.0	3810	0	0	0	6.9	1.3
SK	89	0	0	1.3	-0.3	89	0	0	0	4.8	0.3
SV	62	100	100	46.3	-32.8	61	0	100	0	22.3	15.0
UA	1621	1	14	1.7	0.2	1761	0	15	0	9.2	2.1
WA	443	9	16	2.1	0.9	438	3	100	0	10.3	-0.6
XX	3704	1	7	1.7	0.5	4479	0	100	0	11.3	1.5
ADS	671	1	13	2.2	0.8	674	0	12	0	7.6	0.4
US ACARS	533050	0	13	1.5	0.4	532886	0	14	0	6.7	1.1

MEAN DAILY COUNT OF AIRCRAFT 70 – 500 HPA FIGURE 3
MAY 1999
OBSERVATIONS WITH O–B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED



AIRCRAFT MEAN WINDS BETWEEN 70 AND 500 HPA
MAY 1999
OBSERVATIONS WITH O-B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE MORE THAN 30 OBS ARE PRESENT

FIGURE 4

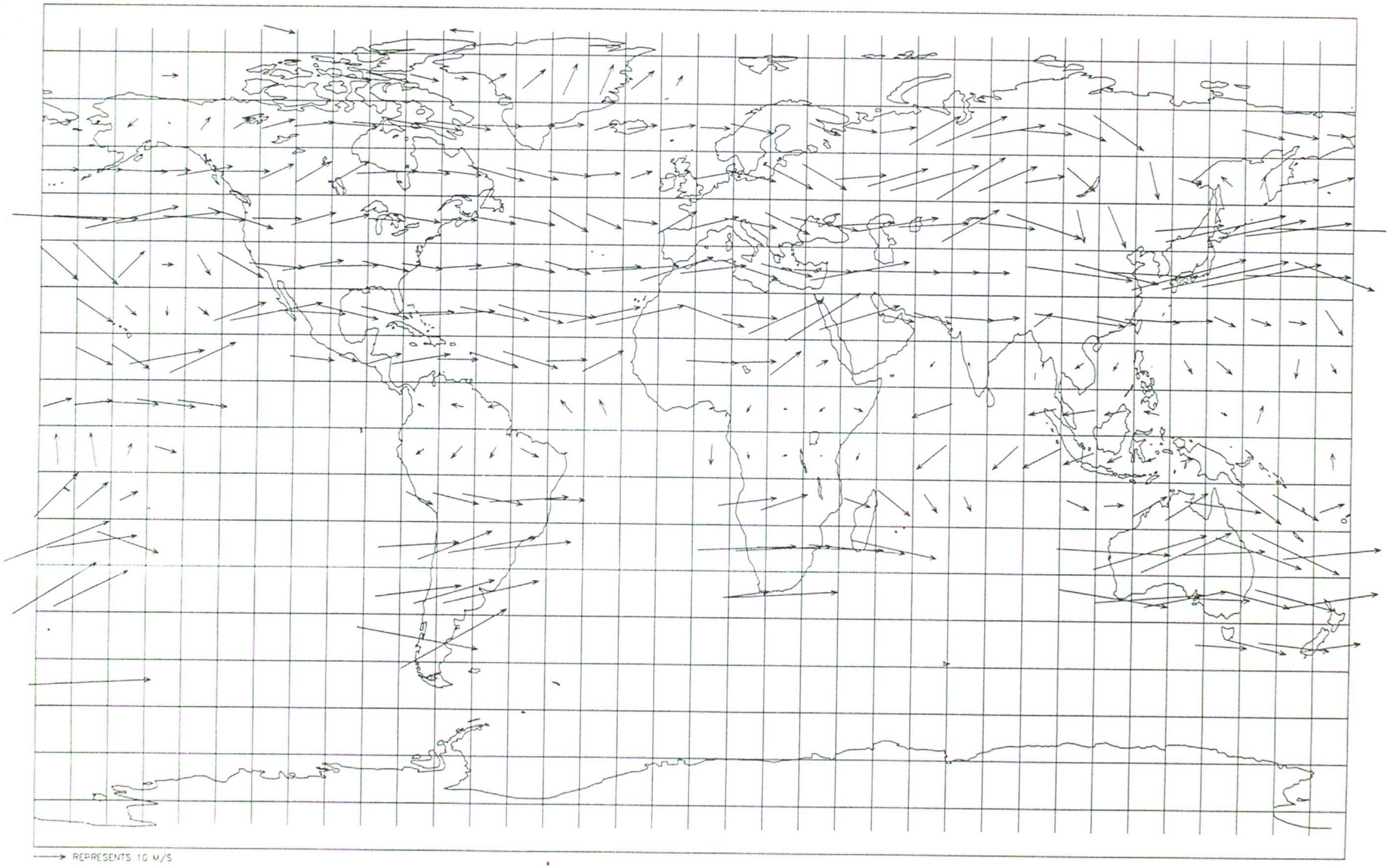
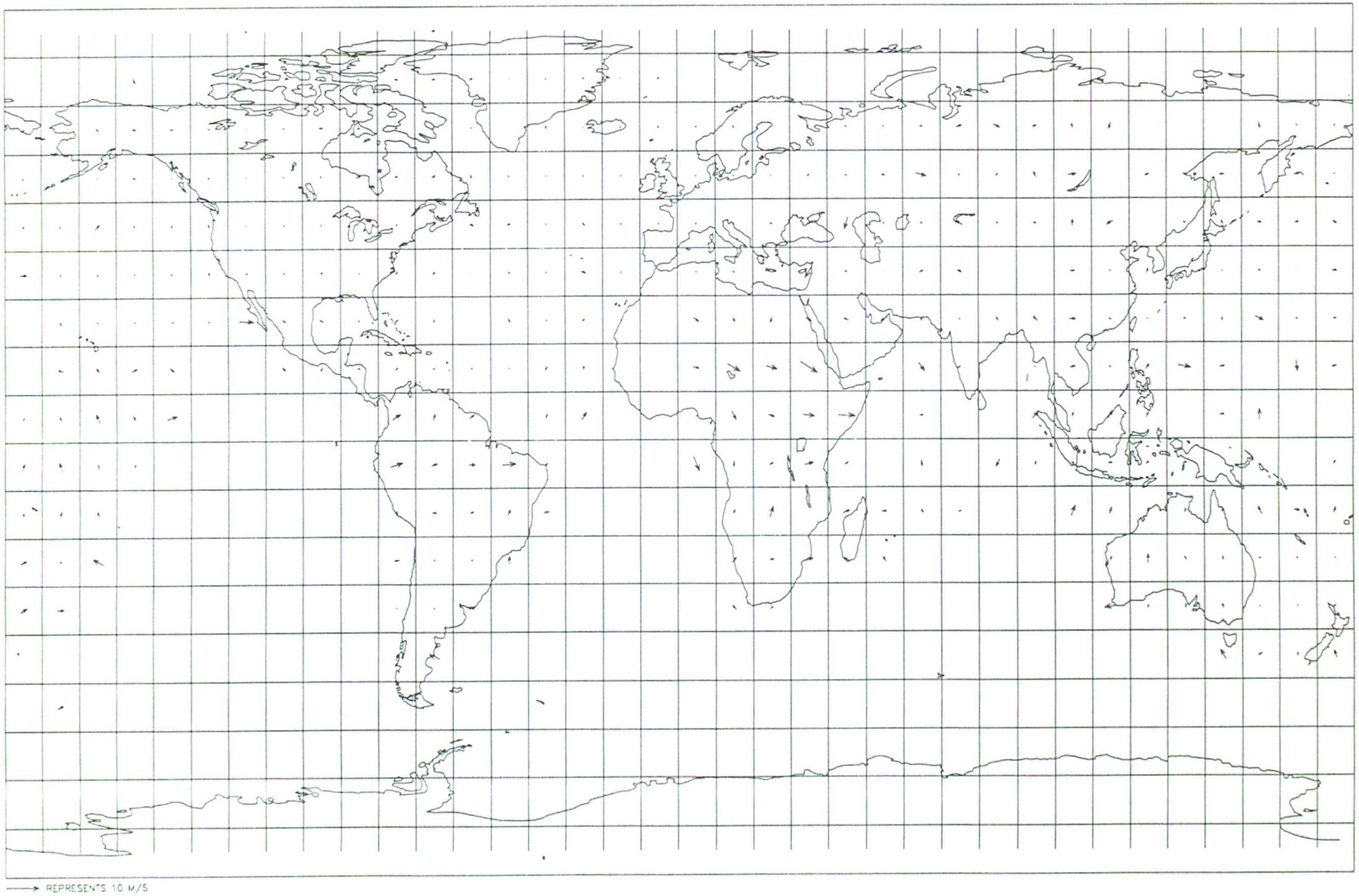
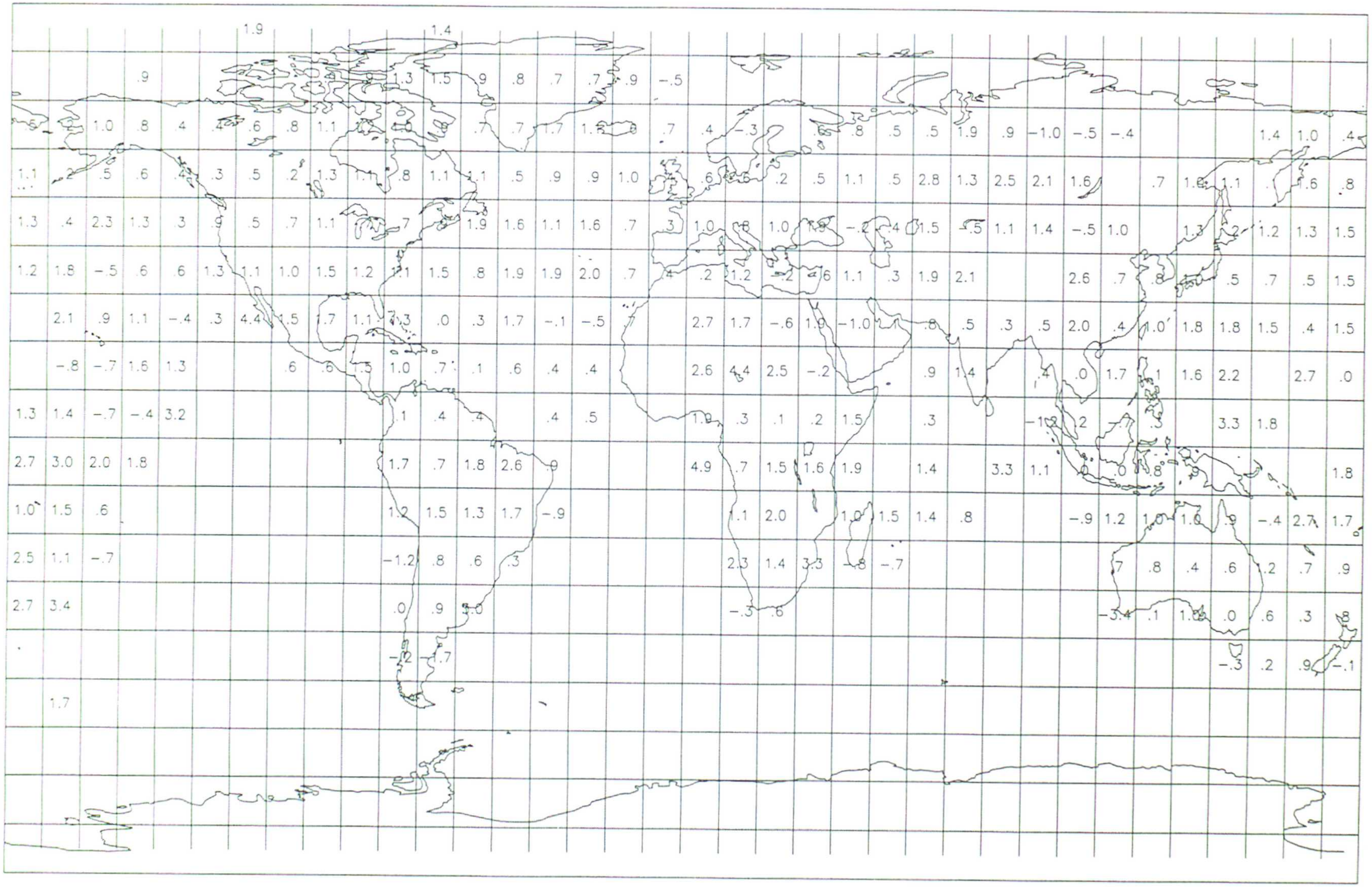


FIGURE 5

AIRCRAFT MEAN O-B WINDS BETWEEN 70 AND 500 HPA
MAY 1999
OBSERVATIONS WITH O-B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE MORE THAN 30 OBS ARE PRESENT



AIRCRAFT : MEAN O-B SPEEDS (M/S) BETWEEN 70 AND 500 HPA FIGURE 6
MAY 1999
OBSERVATIONS WITH O-B VECTOR DIFFERENCE > 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT


1.9 1.4
.9 1.3 1.5 .9 .8 .7 .7 .9 -.5
.5 .2 1.0 .8 .4 .4 .6 .8 1.1 .7 .7 1.7 1.8 .7 .4 -.3 .6 .8 .5 .5 1.9 .9 -1.0 -.5 -.4 1.4 1.0 .4
1.1 .2 .5 .6 .4 .3 .5 .2 1.3 1.1 .8 1.1 1.1 .5 .9 .9 1.0 .6 .5 .2 .5 1.1 .5 2.8 1.3 2.5 2.1 1.6 .7 1.0 1.1 1.6 .8
1.3 .4 2.3 1.3 .3 .9 .5 .7 1.1 .7 1.9 1.6 1.1 1.6 .7 .3 1.0 .8 1.0 1.9 -.2 -.4 1.5 -.5 1.1 1.4 -.5 1.0 1.3 .2 1.2 1.3 1.5
1.2 1.8 -.5 .6 .6 1.3 1.1 1.0 1.5 1.2 1.1 1.5 .8 1.9 1.9 2.0 .7 .4 .2 1.2 -.2 .6 1.1 .3 1.9 2.1 2.6 .7 .8 .5 .7 .5 1.5
2.1 .9 1.1 -.4 .3 4.4 1.5 1.7 1.1 1.3 .0 .3 1.7 -.1 -.5 .7 2.7 1.7 -.6 1.9 -1.0 .8 .5 .3 .5 2.0 .4 1.0 1.8 1.8 1.5 .4 1.5
-.8 -.7 1.6 1.3 .6 .6 1.5 1.0 .7 .1 .6 .4 .4 2.6 4.4 2.5 -.2 .9 1.4 .4 .0 1.7 .1 1.6 2.2 2.7 .0
1.3 1.4 -.7 -.4 3.2 .1 .4 .4 .4 .5 1.0 .3 .1 .2 1.5 .3 -1.2 .2 -.7 .3 3.3 1.8
2.7 3.0 2.0 1.8 1.7 .7 1.8 2.6 .9 4.9 .7 1.5 1.6 1.9 1.4 3.3 1.1 .0 .0 .8 .9 1.8
1.0 1.5 .6 1.2 1.5 1.3 1.7 -.9 1.1 2.0 1.0 1.5 1.4 .8 -.9 1.2 1.0 1.0 .9 -.4 2.7 1.7
2.5 1.1 -.7 -1.2 .8 .6 .3 2.3 1.4 3.3 -.8 -.7 .7 .8 .4 .6 1.2 .7 .9
2.7 3.4 .0 .9 3.0 -.3 .6 -3.4 .1 1.0 .0 .6 .3 .8
-.2 -.7 -.3 .2 .9 -.1
1.7

AIRCRAFT : RMS O-B VECTOR (M/S) BETWEEN 70 AND 500 HPA FIGURE 7
MAY 1999
OBSERVATIONS WITH O-B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

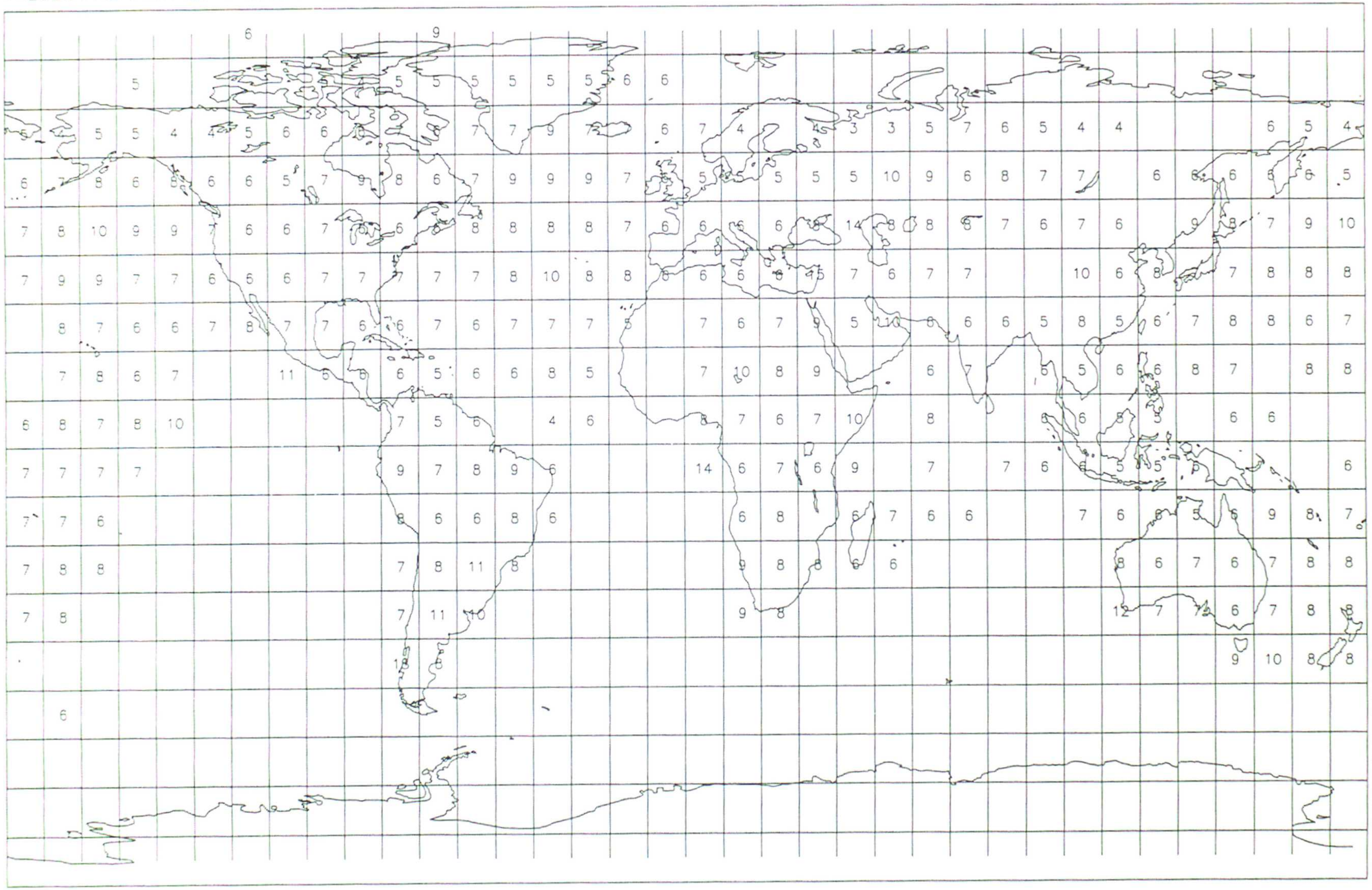

6 9
5 5 5 5 5 5 5 6 6
5 5 5 4 4 5 6 6 6 8 7 7 9 7 6 7 4 3 3 5 7 6 5 4 4 6 5 4
6 7 8 6 8 6 6 5 7 9 8 6 7 9 9 9 7 5 5 5 5 5 10 9 6 8 7 7 6 6 6 6 6 5
7 8 10 9 9 7 6 6 7 6 6 8 8 8 8 8 7 6 6 6 6 8 14 8 8 8 7 6 7 6 9 8 7 9 10
7 9 9 7 7 6 6 6 7 7 7 7 7 8 10 8 8 6 6 6 6 15 7 6 7 7 10 6 8 7 8 8 8
8 7 6 6 7 8 7 7 6 6 7 6 7 7 7 5 7 6 7 9 5 10 6 6 6 5 8 5 6 7 8 8 6 7
7 8 6 7 11 5 6 6 5 6 6 8 5 7 10 8 9 6 7 6 5 6 6 8 7 8 8
6 8 7 8 10 7 5 6 4 6 8 7 6 7 10 8 6 6 5 6 6
7 7 7 7 9 7 8 9 6 14 6 7 6 9 7 7 6 6 5 5 6
7 7 6 8 6 6 8 6 6 8 6 7 6 6 7 6 8 5 6 9 8 7
7 8 8 7 8 11 8 9 8 8 6 6 8 6 7 6 7 8 8
7 8 7 11 10 9 8 12 7 7 6 7 8 8
13 8 9 10 8 8
6

TABLE 5

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: May 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 1000.0 - 30.0 hPa
Element monitored		:GEOPOTENTIAL HEIGHT IN metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown duringperiod.
	:% REJ	:Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
	:NUM LEVELS	:Number of levels satisfying selection criteria.
GROSS ERROR LIMITS	:Defined in Appendix I.1	
SELECTION CRITERIA	: ≥3 levels with ≥10 observations and ≥ 100 m weighted RMS.	

ONLY THE WORST LEVEL IS SHOWN WITH UNWEIGHTED RMS

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS	NUM LEVELS
28698	12	Z	200	55/ 73	27	0	40.5	78.6	88.4	5
42027	00	Z	1000	34/ 75	23	0	16.6	36.1	39.7	4
42027	12	Z	1000	34/ 75	20	0	37.5	-34.8	51.2	7
42101	12	Z	150	30/ 76	18	0	97.4	37.7	104.4	6
42339	00	Z	100	26/ 73	9	1	108.1	79.6	134.2	7
42339	12	Z	150	26/ 73	15	0	132.0	45.6	139.6	6
42361	00	Z	200	26/ 78	14	0	78.8	54.9	96.0	4
42361	12	Z	100	26/ 78	17	0	97.3	131.8	163.9	4
42369	00	Z	30	27/ 81	7	3	112.9	266.7	289.6	4
42369	12	Z	100	27/ 81	14	2	76.6	156.9	174.6	6
42397	00	Z	500	27/ 88	19	0	34.1	-41.6	53.8	5
42492	12	Z	150	26/ 85	27	0	77.6	67.9	103.1	4
42647	00	Z	100	23/ 73	14	1	122.6	56.7	135.1	4
42647	12	Z	100	23/ 73	15	3	58.9	191.1	199.9	8
42667	12	Z	100	23/ 77	16	2	90.2	162.4	185.7	6
42701	12	Z	150	23/ 85	19	0	72.7	72.8	102.9	4
42724	00	Z	100	24/ 91	10	0	79.1	107.9	133.8	4
42809	00	Z	100	23/ 88	22	1	101.3	89.6	135.3	4
42809	12	Z	150	23/ 88	23	0	85.2	54.5	101.2	4
42867	12	Z	150	21/ 79	26	0	66.5	98.5	118.9	4
42874	12	Z	150	21/ 82	20	0	99.1	88.9	133.1	5
42971	00	Z	100	20/ 86	20	0	103.1	106.5	148.2	4
42971	12	Z	150	20/ 86	23	0	85.0	67.5	108.5	4
43003	12	Z	150	19/ 73	18	6	69.4	137.3	153.8	7
43014	12	Z	100	20/ 75	11	0	133.3	-34.2	137.6	5
43128	12	Z	150	17/ 78	25	0	78.0	106.2	131.7	5
43279	00	Z	100	13/ 80	25	0	110.3	70.4	130.9	4
43279	12	Z	100	13/ 80	25	1	96.0	94.1	134.4	6
43295	12	Z	100	13/ 78	24	0	112.9	49.5	123.3	4
43311	00	Z	300	11/ 73	19	0	48.1	-57.5	74.9	5
43311	12	Z	200	11/ 73	20	0	91.4	-31.2	96.6	5
43369	00	Z	100	8/ 73	20	0	84.5	-112.2	140.5	6
53513	12	Z	100	41/ 107	29	0	42.4	105.7	113.9	4
53915	00	Z	1000	36/ 107	28	0	21.3	62.0	65.5	6
53915	12	Z	1000	36/ 107	31	0	20.0	36.8	41.9	5
54135	00	Z	250	44/ 122	27	0	25.6	73.6	77.9	5
54135	12	Z	200	44/ 122	29	0	29.4	74.5	80.1	4
54161	12	Z	200	44/ 125	30	0	63.9	50.0	81.1	4
56985	00	Z	100	23/ 103	29	0	37.1	143.2	147.9	4
57816	00	Z	1000	26/ 107	27	0	11.8	38.1	39.9	4
62306	12	Z	250	31/ 27	31	0	31.7	88.6	94.1	5
83612	00	Z	100	-20/ -55	22	0	52.4	144.7	153.9	4
89009	00	Z	850	-90/ 0	2	22	60.0	28.0	66.2	5
89664	00	Z	400	-78/ 167	22	0	27.7	70.2	75.5	5
97560	00	Z	100	-1/ 136	10	0	87.6	-68.8	111.4	6

AVAILABILITY – TEMP – 500 HPA GEOPOTENTIAL – MAY 1999

ALL HOURS

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS – 1106

FIGURE 8

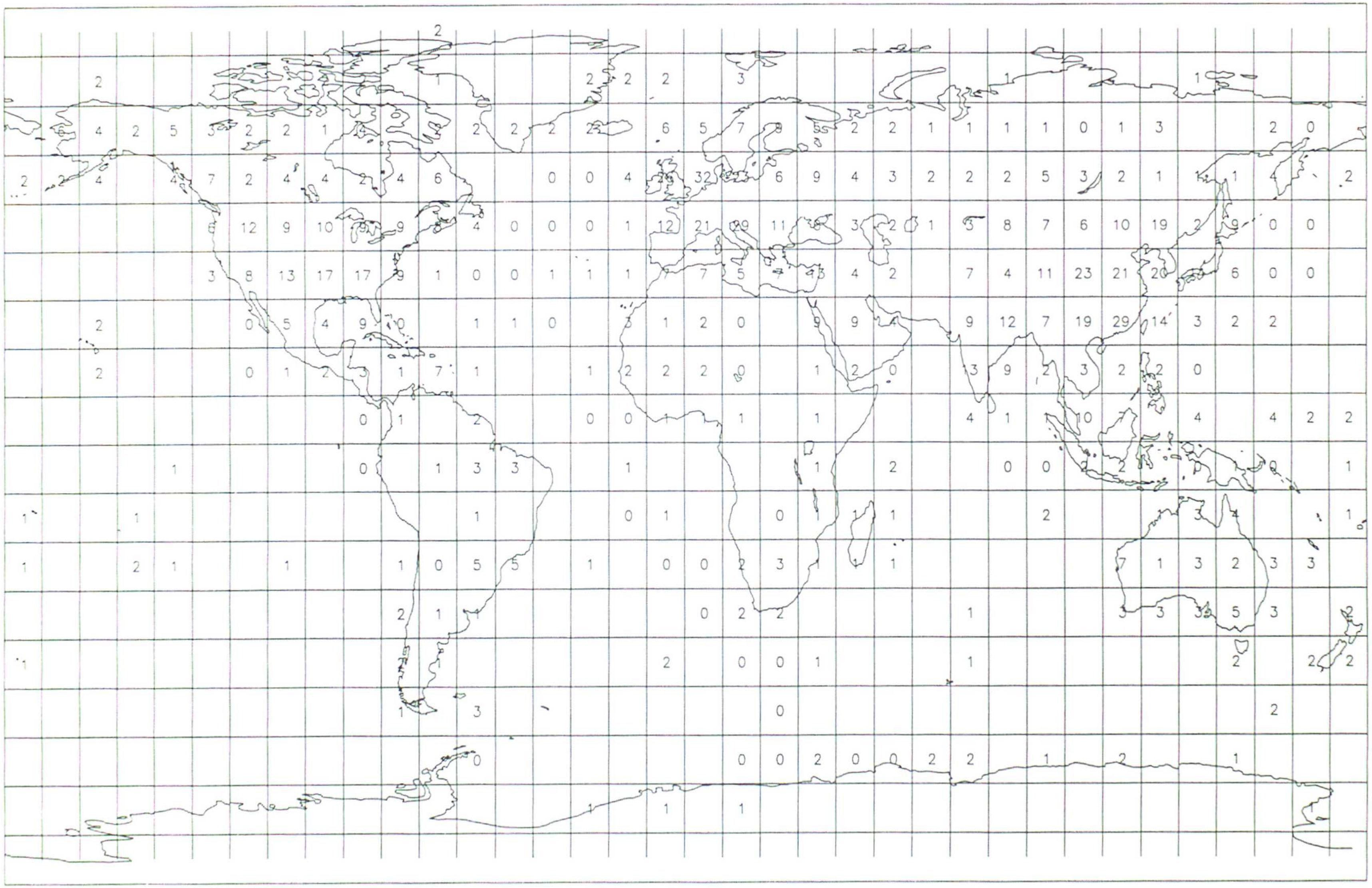

2
2 1 2 2 2 3 1 1
6 4 2 5 3 2 2 1 2 2 2 2 6 5 7 9 5 2 2 1 1 1 1 0 1 3 2 0
2 2 4 4 7 2 4 4 2 4 6 0 0 4 29 32 6 9 4 3 2 2 2 5 3 2 1 1 1 4 2
6 12 9 10 9 4 0 0 0 1 12 21 29 11 8 3 2 1 3 8 7 6 10 19 2 9 0 0
3 8 13 17 17 9 1 0 0 1 1 1 7 7 5 7 3 4 2 7 4 11 23 21 20 6 0 0
2 0 5 4 9 0 1 1 0 3 1 2 0 9 9 4 9 12 7 19 29 14 3 2 2
2 0 1 2 3 1 7 1 1 2 2 2 0 1 2 0 3 9 2 3 2 2 0
0 1 2 0 0 1 1 1 4 1 1 10 7 4 4 2 2
1 0 1 3 3 1 1 2 0 0 2 0 1
1 1 1 0 1 0 1 1 1 2 3 4 1 1
1 2 1 1 1 0 5 5 1 0 0 2 3 1 1 1 7 1 3 2 3 3
2 1 1 0 2 2 1 3 3 3 5 3 2
1 1 2 0 0 1 1 2 2 2
1 3 0 2
0 0 0 2 0 0 2 2 1 2 1
1 1 1

TABLE 6

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: May 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 1000.0 - 100.0 hPa
Element monitored		:VECTOR WIND in m s^{-1}
Parameters monitored		
	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:% REJ	:Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.
	:UBIAS,VBIAS	:Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
	:NUM LEVELS	:Number of levels satisfying selection criteria.
GROSS ERROR LIMITS	:Defined in Appendix I.2	
SELECTION CRITERIA	: > 10 observations and > 15 m s^{-1} RMS vector wind.	

ONLY THE STANDARD LEVEL BETWEEN 1000 - 100 hPa WITH HIGHEST RMS IS SHOWN

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	% REJ	UBIAS	VBIAS	RMS	LEVELS

AVAILABILITY – TEMP/PILOT – 300 HPA WIND – MAY 1999

FIGURE 9

ALL HOURS

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS – 1197

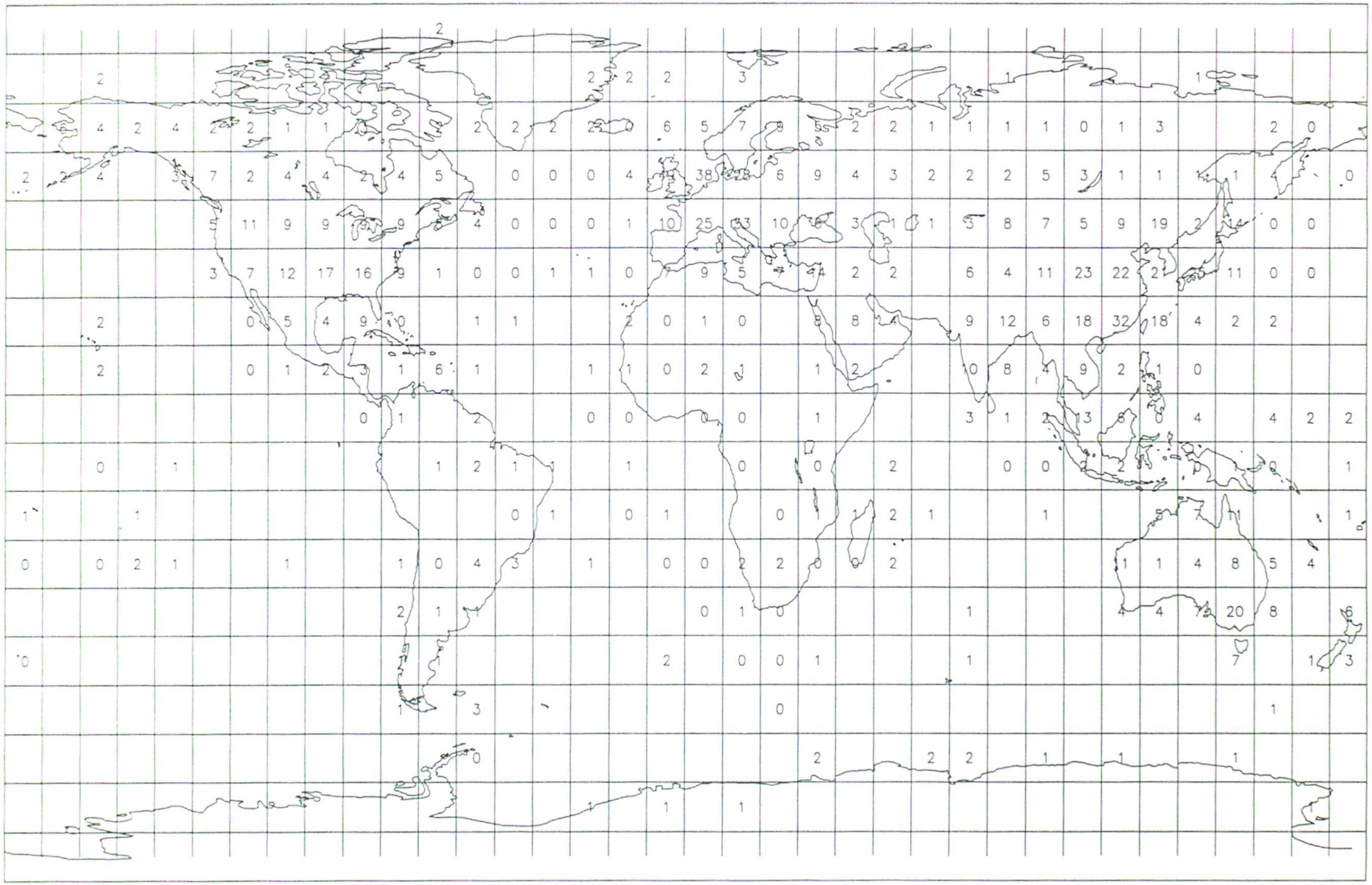

2
2 2 2 2 3 1 1
6 4 2 4 2 2 1 1 0 2 2 2 2 23 0 6 5 7 9 55 2 2 1 1 1 1 0 1 3 2 0
2 2 4 3 7 2 4 4 2 4 5 0 0 0 4 49 38 23 6 9 4 3 2 2 2 5 3 1 1 1 1 4 0
5 11 9 9 9 9 4 0 0 0 1 10 25 33 10 6 3 1 1 3 8 7 5 9 19 2 14 0 0
3 7 12 17 16 9 1 0 0 1 1 0 7 9 5 7 44 2 2 6 4 11 23 22 21 25 11 0 0
2 0 5 4 9 0 1 1 2 0 1 0 8 8 4 9 12 6 18 32 18 4 2 2
2 0 1 2 3 1 6 1 1 1 0 2 1 1 2 10 8 4 9 2 1 0
0 1 2 0 0 0 0 1 3 1 2 13 8 0 4 4 2 2
0 1 1 2 1 1 1 0 0 2 0 0 2 2 0 0 1
1 1 0 1 0 1 0 1 1 2 1 1 5 7 11 1
0 0 2 1 1 1 0 4 3 1 0 0 2 2 0 0 2 1 1 4 8 5 4
2 1 1 0 1 0 1 4 4 7 20 8 6
0 1 1 2 0 0 1 1 7 1 3
1 3 0 1
0 2 2 2 1 1 1
1 1 1

TABLE 7

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: May 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 500.0 - 150.0 hPa
Element monitored		:WIND DIRECTION in degrees
Parameters monitored		
	:NUM OBS	:Average number of observations at all levels.
	:BIAS	:Mean difference of observations from background values from all levels.
	:MAX SPREAD	:(For observation - background values) Maximum absolute difference of SD at any level from SD at all levels
	:SD	:SD of difference of observations from background values at all levels.

SELECTION CRITERIA

:NUM OBS > 5, and
ABSOLUTE BIAS ≥ 10°, with
SD < 30°, and
MAX SPREAD < 10°

WMO IDENT	OBS TIME	ELM	LAT/LONG	NUM OBS	BIAS	MAX SPREAD	SD
17240	12	DD	38/ 31	24	-11.9	8.7	14.2
17280	00	DD	38/ 40	25	-12.7	4.9	11.7
17280	12	DD	38/ 40	25	-13.3	6.1	10.7
40375	12	DD	28/ 37	28	-11.8	8.6	18.8
42182	00	DD	29/ 77	23	-10.5	3.9	13.5
42724	00	DD	24/ 91	8	-14.2	6.1	21.3
43279	00	DD	13/ 80	13	-10.2	5.5	21.4
54497	12	DD	40/ 124	26	-12.1	3.4	10.8
59134	00	DD	24/ 118	28	10.2	4.7	13.1
59280	00	DD	24/ 113	26	10.4	8.1	17.8
62337	00	DD	31/ 34	24	-15.5	4.7	11.4
62337	12	DD	31/ 34	28	-17.7	6.1	14.6
78583	12	DD	18/ -88	18	10.6	5.5	18.3
82965	00	DD	-10/ -56	12	-10.5	9.6	26.1
91413	12	DD	9/ 138	14	-11.0	6.4	24.8
96315	00	DD	5/ 115	18	12.5	7.0	24.4
96441	12	DD	3/ 113	15	12.5	4.2	17.8
96749	00	DD	-6/ 107	10	-27.1	9.7	22.2

MONITORING OF SATELLITE WINDS

MONITORING CENTRE: BRACKNELL

MONTH: May 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from GOES, METEOSAT, GMS, INSAT.

Standard of comparison :Background field from UKMO global model.

Selection Criteria :number of observations > 10.

Data Extracted :Layer 701 - 1000 hPa
401 - 700 hPa
101 - 400 hPa

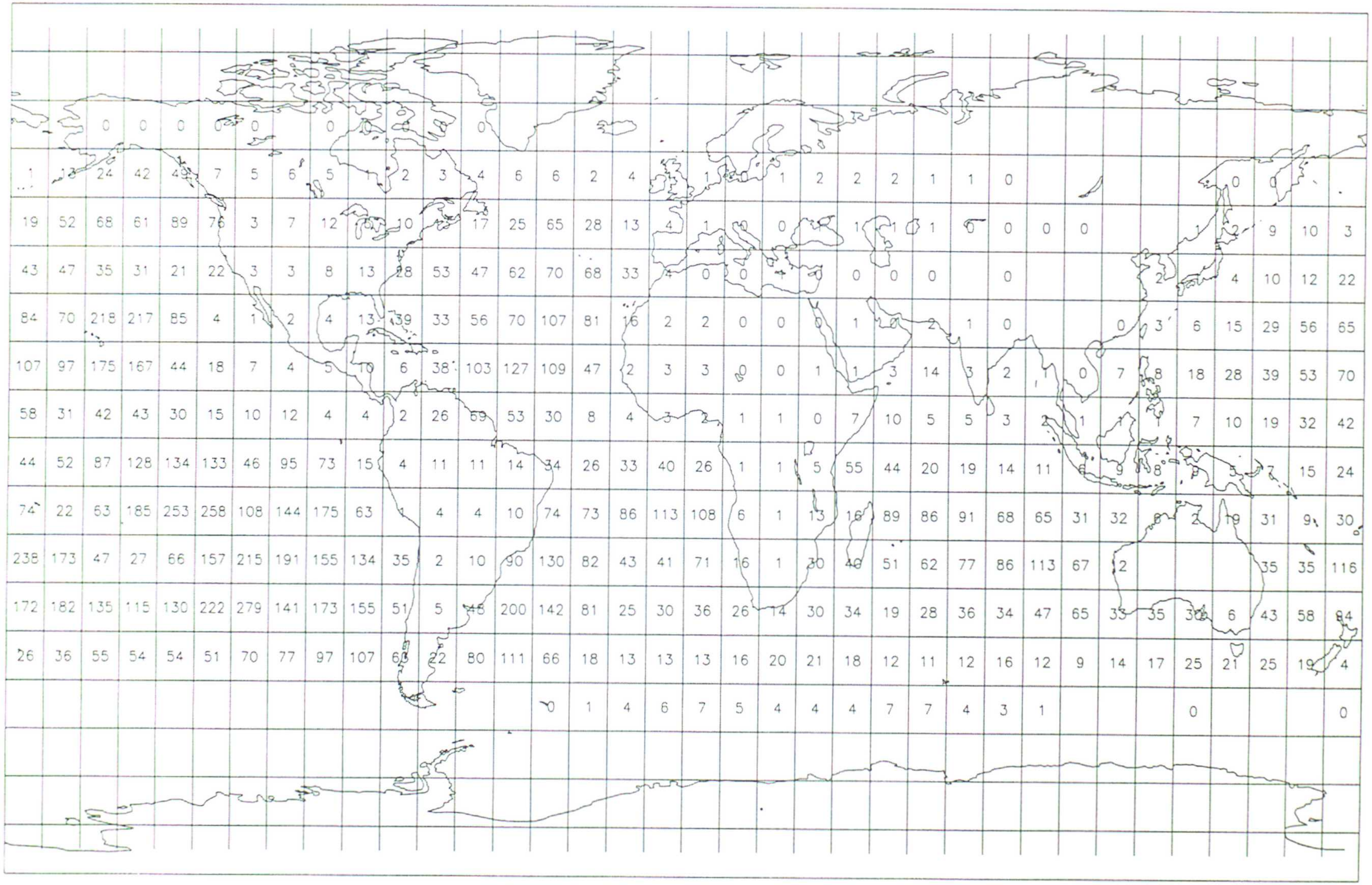
:Mean wind

:Mean observation minus background vector wind differences

:Mean observation minus background speed differences

:RMS of observation minus background vector differences

AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 701 AND 1000 HPA FIGURE 10
MAY 1999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1 13 24 42 49 7 5 6 5 1 2 3 4 6 6 2 4 1 1 2 2 2 1 1 0 0 0
19 52 68 61 89 76 3 7 12 10 17 25 65 28 13 4 1 0 0 1 1 1 1 0 0 0 0 1 2 9 10 3
43 47 35 31 21 22 3 3 8 13 28 53 47 62 70 68 33 4 0 0 0 0 0 0 0 2 4 10 12 22
84 70 218 217 85 4 1 2 4 13 39 33 56 70 107 81 16 2 2 0 0 0 1 0 2 1 0 0 3 6 15 29 56 65
107 97 175 167 44 18 7 4 5 10 6 38 103 127 109 47 2 3 3 0 0 1 1 3 14 3 2 1 0 7 8 18 28 39 53 70
58 31 42 43 30 15 10 12 4 4 2 26 59 53 30 8 4 3 2 1 1 0 7 10 5 5 3 2 1 1 1 7 10 19 32 42
44 52 87 128 134 133 46 95 73 15 4 11 11 14 34 26 33 40 26 1 1 5 55 44 20 19 14 11 6 9 8 9 5 7 15 24
74 22 63 185 253 258 108 144 175 63 1 4 4 10 74 73 86 113 108 6 1 13 16 89 86 91 68 65 31 32 8 2 19 31 9 30
238 173 47 27 66 157 215 191 155 134 35 2 10 90 130 82 43 41 71 16 1 30 40 51 62 77 86 113 67 2 35 35 116
172 182 135 115 130 222 279 141 173 155 51 5 48 200 142 81 25 30 36 26 14 30 34 19 28 36 34 47 65 33 35 30 6 43 58 84
26 36 55 54 54 51 70 77 97 107 63 22 80 111 66 18 13 13 13 16 20 21 18 12 11 12 16 12 9 14 17 25 21 25 19 4
0 1 4 6 7 5 4 4 4 7 7 4 3 1 0 0

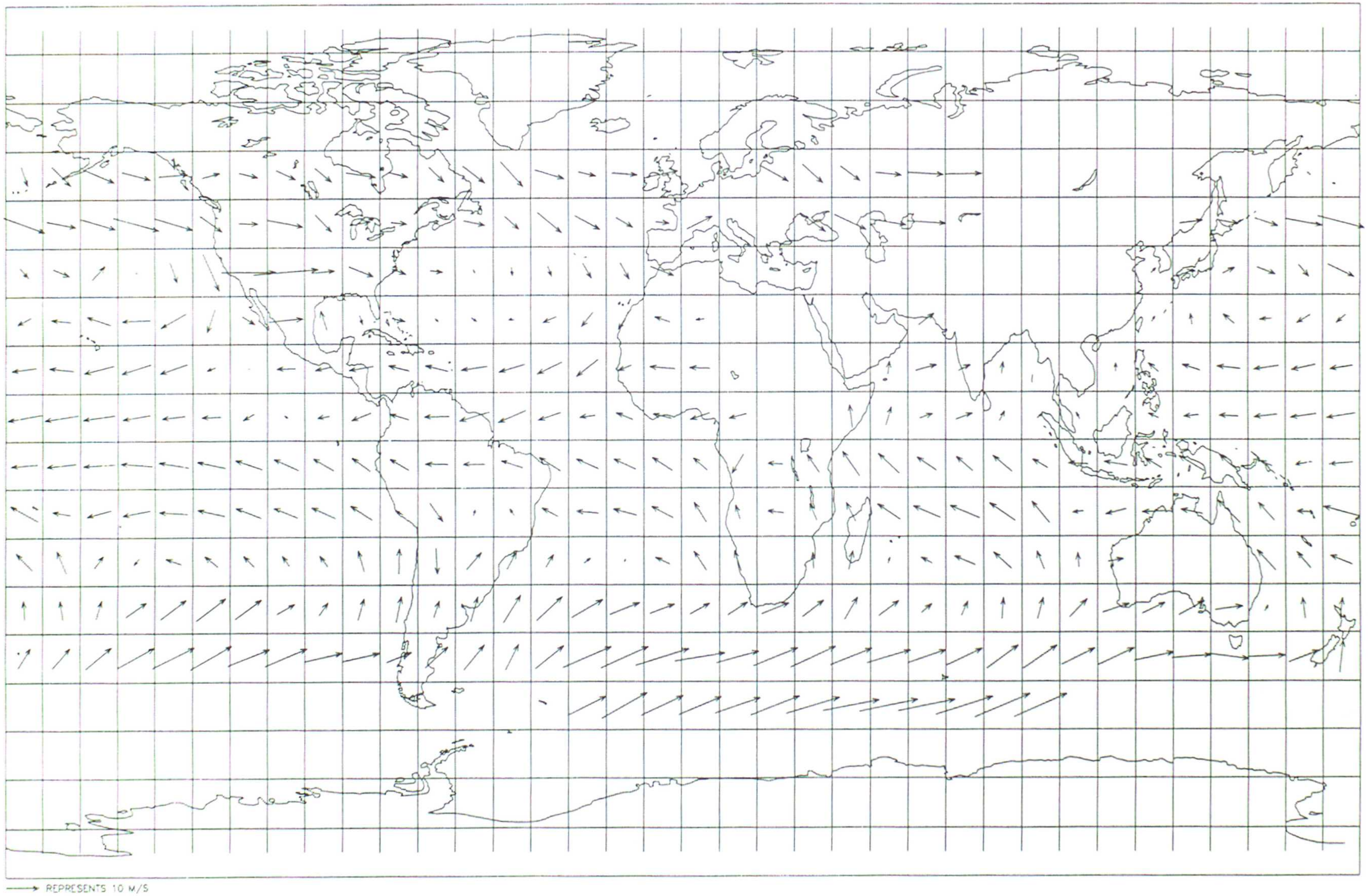
SATOB METEOSAT W/V VECTOR MEAN WINDS BETWEEN 701–1000 HPA

FIGURE 11

MAY 1999

ALL OBSERVATIONS

ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT


REPRESENTS 10 M/S

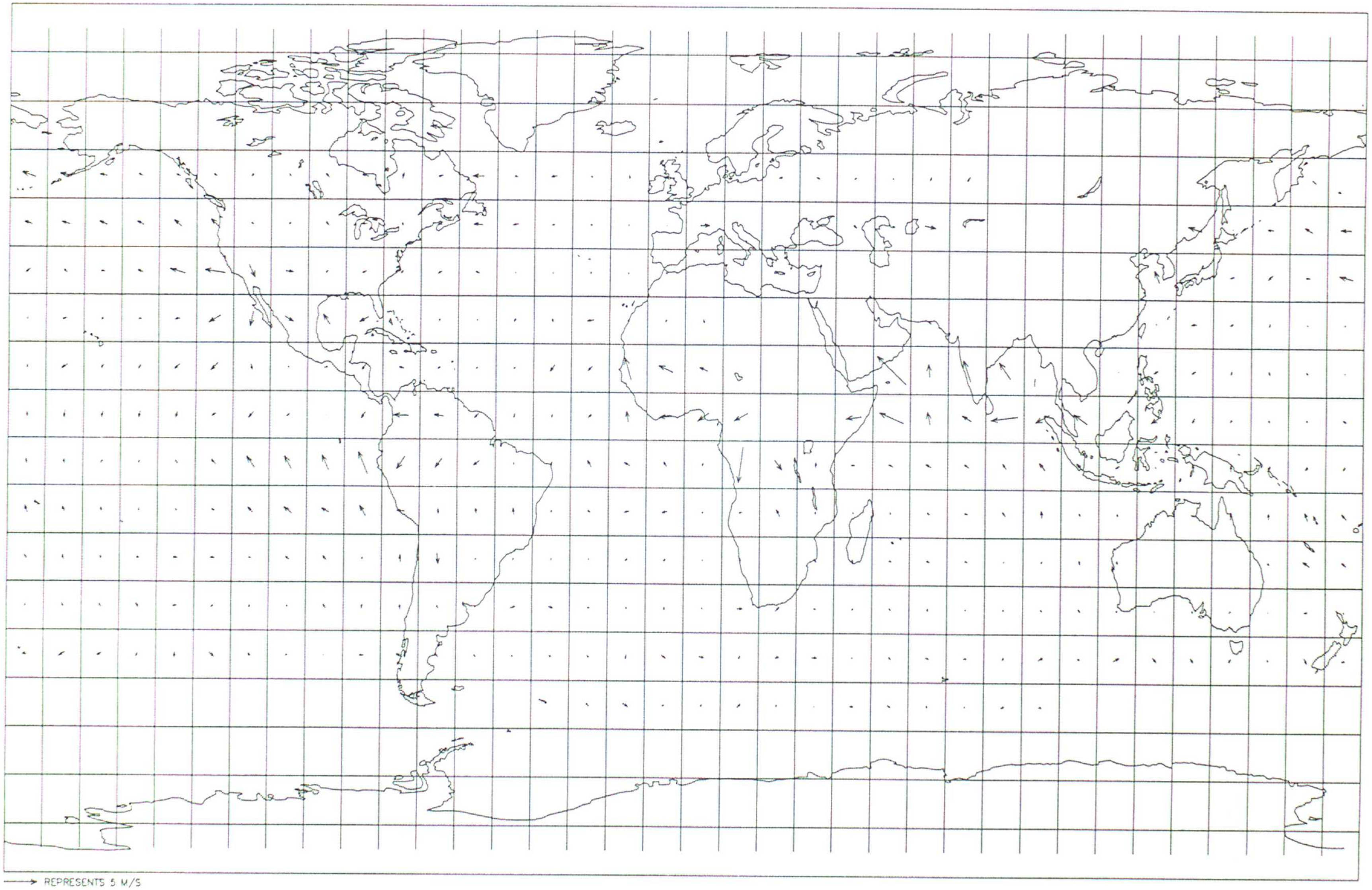
SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 701-1000 HPA

FIGURE 12

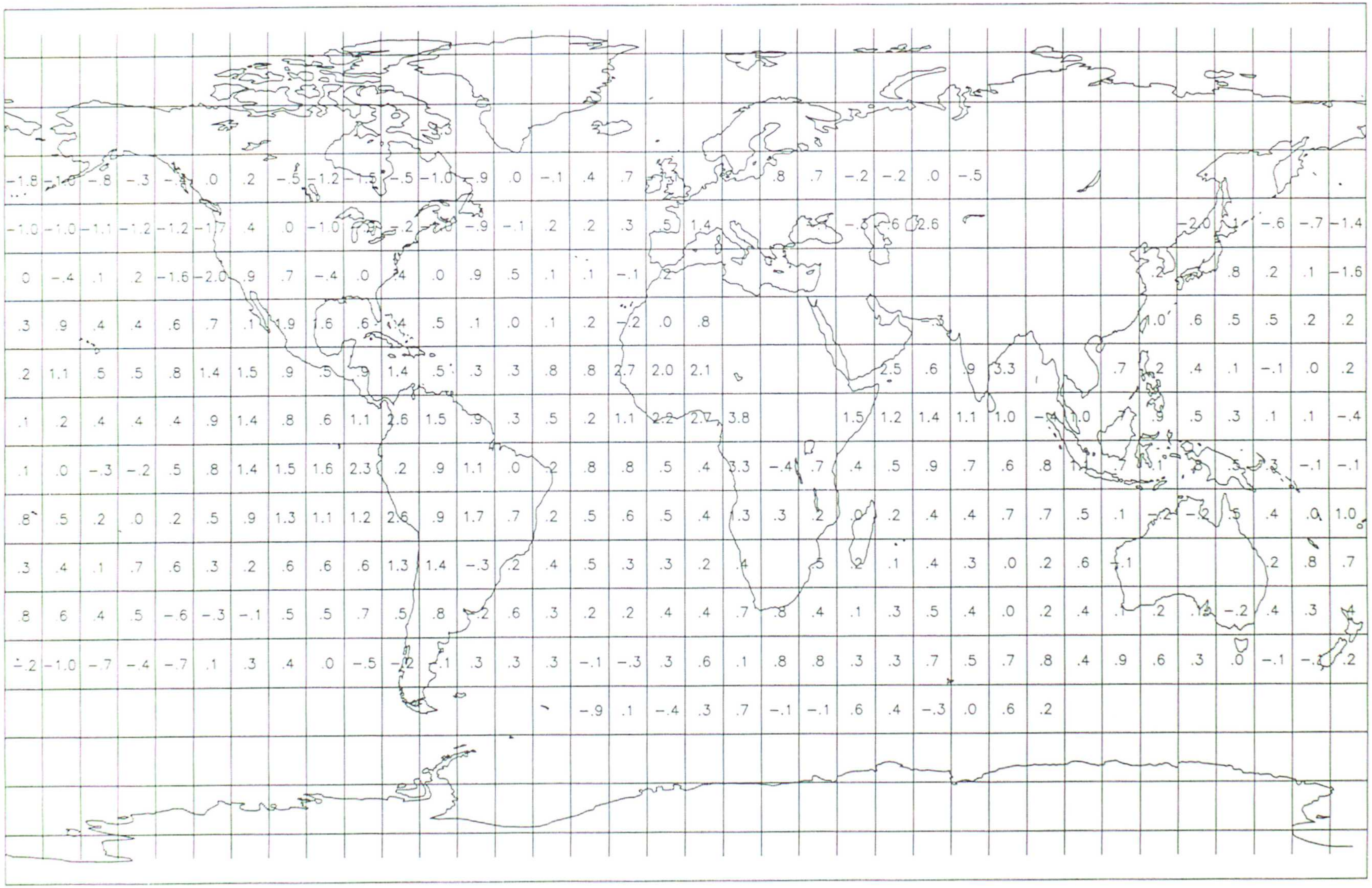
MAY 1999

ALL OBSERVATIONS

ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT

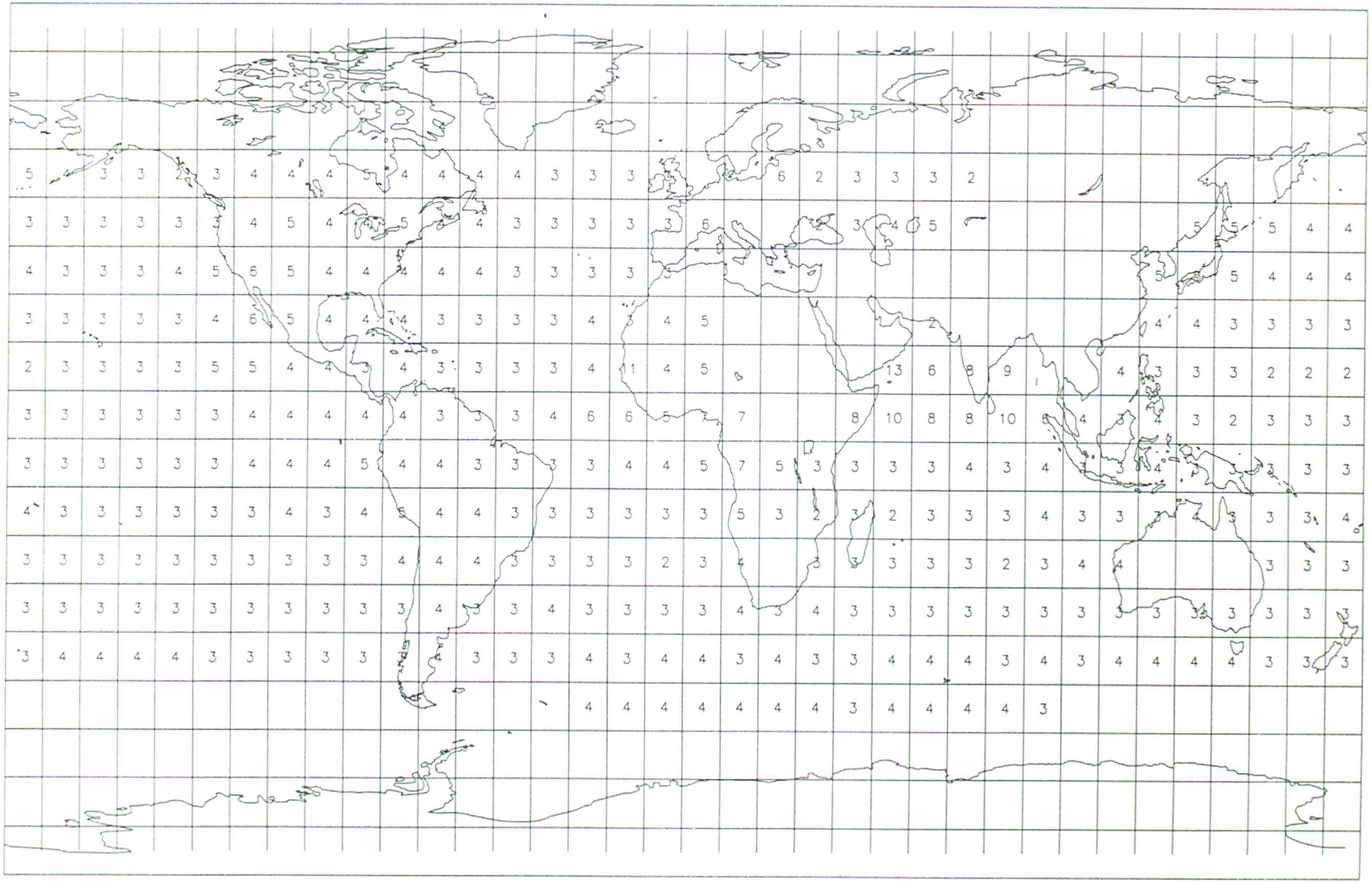

REPRESENTS 5 M/S

SATOBS : MEAN O-B SPEED DIFFERENCES (M/S) BETWEEN 701 AND 1000 HPA FIGURE 13
MAY 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT

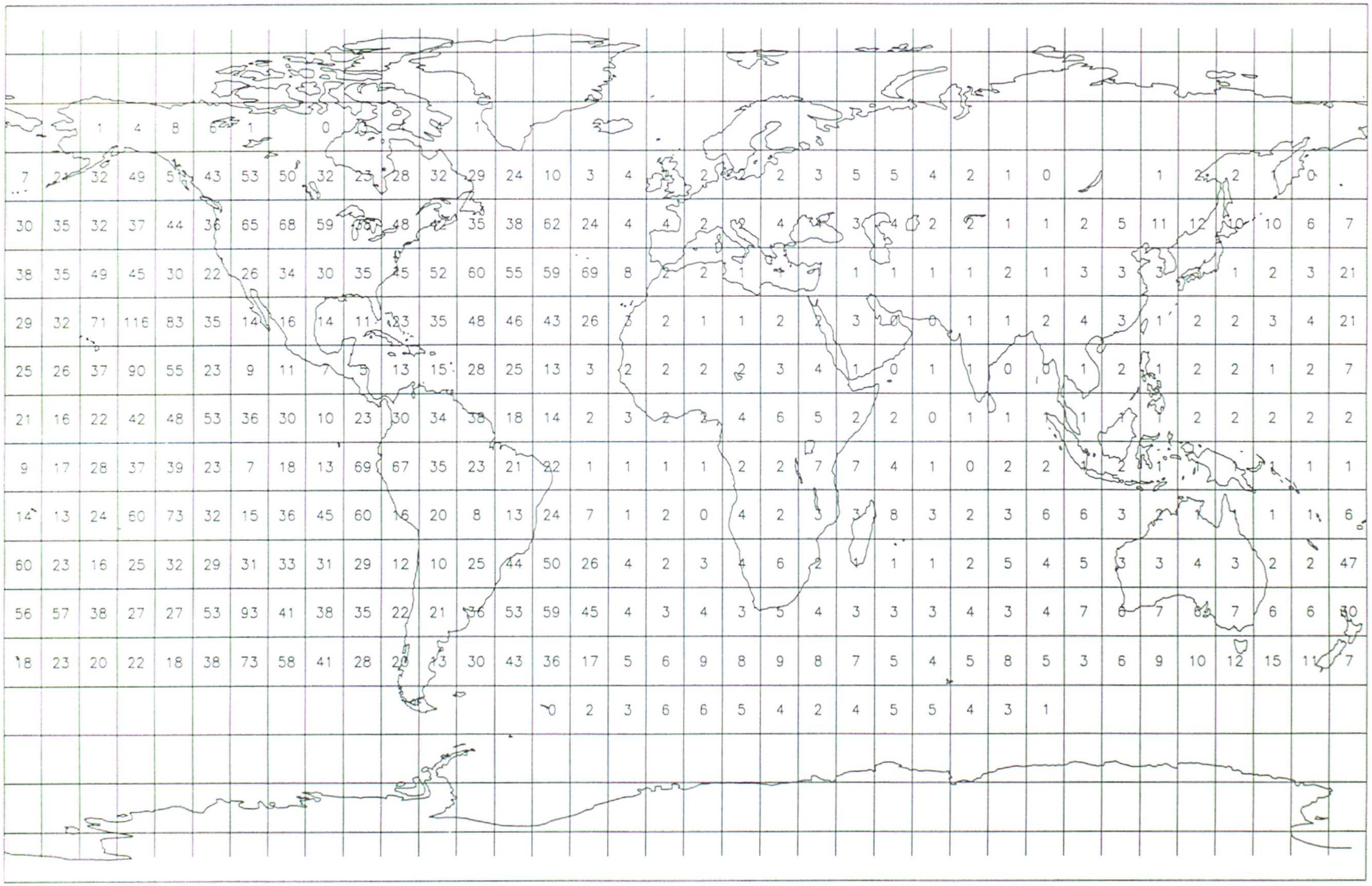


-1.8 -1.0 -.8 -.3 -.4 .0 .2 -.5 -1.2 -1.5 -.5 -1.0 -.9 .0 -.1 .4 .7 .8 .7 -.2 -.2 .0 -.5
-1.0 -1.0 -1.1 -1.2 -1.2 -1.7 .4 .0 -1.0 -.2 -2.0 -.9 -.1 .2 .2 .3 .5 1.4 -.3 -.6 2.6 -2.0 .1 -.6 -.7 -1.4
0 -.4 .1 .2 -1.6 -2.0 .9 .7 -.4 .0 .4 .0 .9 .5 .1 .1 -.1 .2 .2 .8 .2 .1 -1.6
.3 .9 .4 .4 .6 .7 .1 1.9 1.6 .6 .4 .5 .1 .0 .1 .2 -.2 .0 .8 -.3 1.0 .6 .5 .5 .2 .2
.2 1.1 .5 .5 .8 1.4 1.5 .9 .5 .9 1.4 .5 .3 .3 .8 .8 2.7 2.0 2.1 2.5 .6 .9 3.3 .7 .2 .4 .1 -.1 .0 .2
.1 .2 .4 .4 .4 .9 1.4 .8 .6 1.1 2.6 1.5 .9 .3 .5 .2 1.1 2.2 2.7 3.8 1.5 1.2 1.4 1.1 1.0 -.4 1.0 .7 .9 .5 .3 .1 .1 -.4
.1 .0 -.3 -.2 .5 .8 1.4 1.5 1.6 2.3 .2 .9 1.1 .0 .2 .8 .8 .5 .4 3.3 -.4 .7 .4 .5 .9 .7 .6 .8 1.1 .7 .1 .8 .5 .3 -.1 -.1
.8 .5 .2 .0 .2 .5 .9 1.3 1.1 1.2 2.6 .9 1.7 .7 .2 .5 .6 .5 .4 1.3 .3 .2 .0 .2 .4 .4 .7 .7 .5 .1 -.2 -.2 .5 .4 .0 1.0
.3 .4 .1 .7 .6 .3 .2 .6 .6 .6 1.3 1.4 -.3 .2 .4 .5 .3 .3 .2 .4 .5 .2 .1 .4 .3 .0 .2 .6 -.1 .2 .8 .7
.8 .6 .4 .5 -.6 -.3 -.1 .5 .5 .7 .5 .8 -.2 .6 .3 .2 .2 .4 .4 .7 .8 .4 .1 .3 .5 .4 .0 .2 .4 .1 .2 .1 -.2 .4 .3 .4
-.2 -1.0 -.7 -.4 -.7 .1 .3 .4 .0 -.5 -.2 -.1 .3 .3 .3 -.1 -.3 .3 .6 .1 .8 .8 .3 .3 .7 .5 .7 .8 .4 .9 .6 .3 .0 -.1 -.1 .2
-.9 .1 -.4 .3 .7 -.1 -.1 .6 .4 -.3 .0 .6 .2

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 701 AND 1000 HPA FIGURE 14
MAY 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


5 3 3 2 3 4 4 4 5 4 4 4 4 3 3 3 6 2 3 3 3 2
3 3 3 3 3 3 4 5 4 4 5 4 4 3 3 3 3 3 6 3 4 5 5 5 5 4 4
4 3 3 3 4 5 6 5 4 4 4 4 4 3 3 3 3 3 5 5 4 4 4
3 3 3 3 3 4 6 5 4 4 4 3 3 3 3 4 3 4 5 2 4 4 3 3 3 3
2 3 3 3 3 5 5 4 4 3 4 3 3 3 3 4 11 4 5 13 6 8 9 4 3 3 3 2 2 2
3 3 3 3 3 3 4 4 4 4 4 3 3 3 4 6 6 5 7 7 8 10 8 8 10 8 4 3 4 3 2 3 3 3
3 3 3 3 3 3 4 4 4 5 4 4 3 3 3 3 4 4 5 7 5 3 3 3 3 4 3 4 3 3 4 3 3 3 3
4 3 3 3 3 3 3 4 3 4 5 4 4 3 3 3 3 3 3 5 3 2 3 2 3 3 3 4 3 3 3 4 3 3 3 4
3 3 3 3 3 3 3 3 3 3 4 4 4 3 3 3 3 2 3 4 3 3 3 3 3 2 3 4 4 3 3 3
3 3 3 3 3 3 3 3 3 3 3 4 3 3 4 3 3 3 3 4 3 4 3 3 3 3 3 3 3 3 3 3 3 3 3 3
3 4 4 4 4 3 3 3 3 3 3 4 3 3 3 4 3 4 4 3 4 3 3 4 4 4 3 4 3 4 4 4 4 3 3 3
4 4 4 4 4 4 4 3 4 4 4 4 3

AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 401 AND 700 HPA FIGURE 15
MAY 1999


1 4 8 6 1 0 1
7 21 32 49 51 43 53 50 32 23 28 32 29 24 10 3 4 2 2 2 2 3 5 5 4 2 1 0 1 2 2 0
30 35 32 37 44 36 65 68 59 36 48 42 35 38 62 24 4 4 2 2 4 4 3 4 2 2 1 1 2 5 11 12 10 10 6 7
38 35 49 45 30 22 26 34 30 35 45 52 60 55 59 69 8 2 2 1 1 1 1 1 1 1 2 1 3 3 3 1 2 3 21
29 32 71 116 83 35 14 16 14 11 23 35 48 46 43 26 3 2 1 1 2 2 3 0 0 1 1 2 4 3 1 2 2 3 4 21
25 26 37 90 55 23 9 11 7 5 13 15 28 25 13 3 2 2 2 2 3 4 1 0 1 1 0 0 1 2 1 2 2 1 2 7
21 16 22 42 48 53 36 30 10 23 30 34 38 18 14 2 3 2 2 4 6 5 2 2 0 1 1 1 1 1 1 2 2 2 2 2
9 17 28 37 39 23 7 18 13 69 67 35 23 21 22 1 1 1 1 2 2 7 7 4 1 0 2 2 1 2 1 1 1 1 1 1
14 13 24 60 73 32 15 36 45 60 16 20 8 13 24 7 1 2 0 4 2 3 3 8 3 2 3 6 6 3 2 1 1 1 1 6
60 23 16 25 32 29 31 33 31 29 12 10 25 44 50 26 4 2 3 4 6 2 1 1 1 2 5 4 5 3 3 4 3 2 2 47
56 57 38 27 27 53 93 41 38 35 22 21 36 53 59 45 4 3 4 3 5 4 3 3 3 4 3 4 7 6 7 6 7 6 6 30
18 23 20 22 18 38 73 58 41 28 20 13 30 43 36 17 5 6 9 8 9 8 7 5 4 5 8 5 3 6 9 10 12 15 11 7
0 2 3 6 6 5 4 2 4 5 5 4 3 1

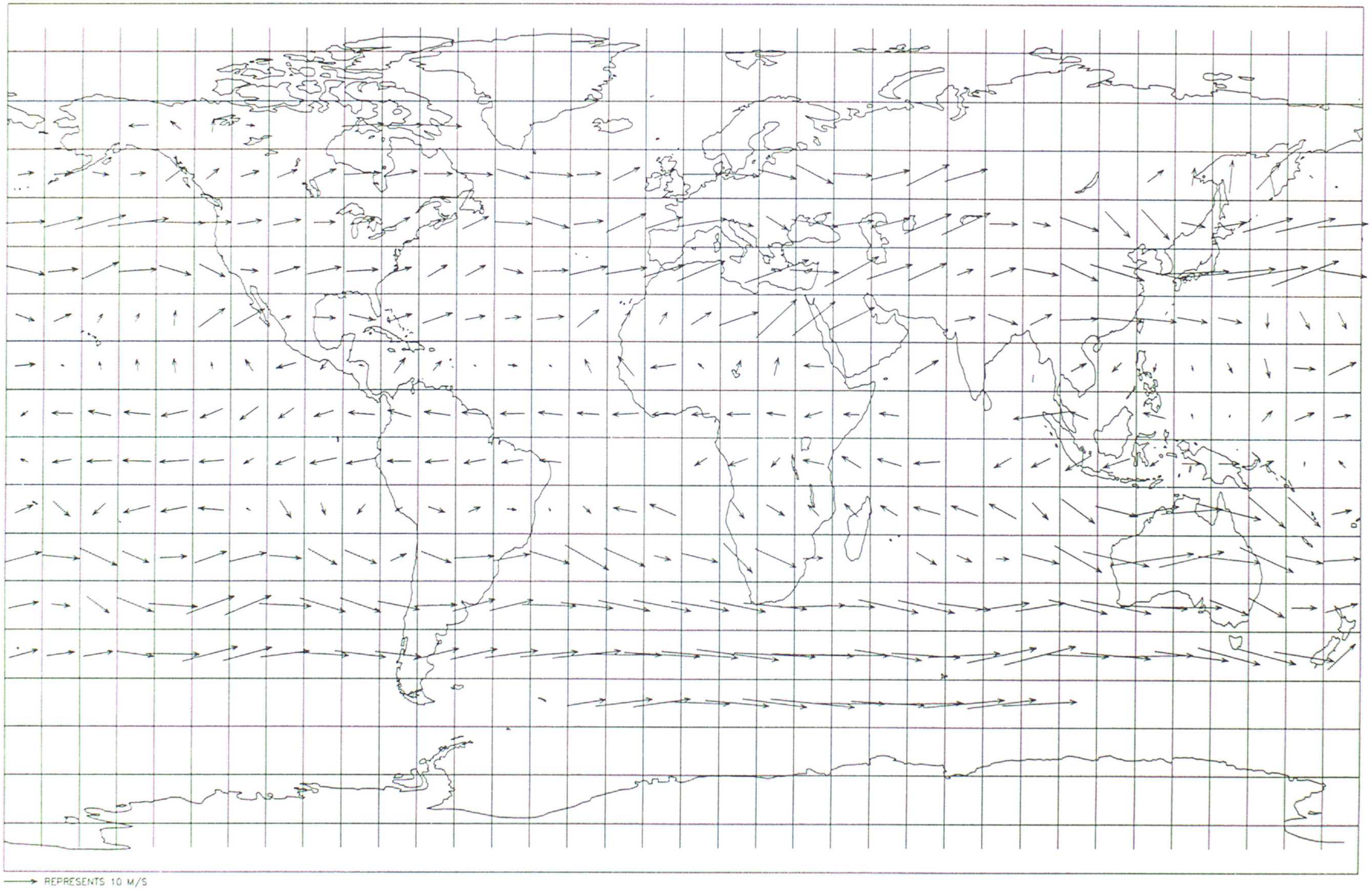
SATOB VECTOR MEAN WINDS BETWEEN 401–700 HPA

FIGURE 16

MAY 1999

ALL OBSERVATIONS

ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT


REPRESENTS 10 M/S

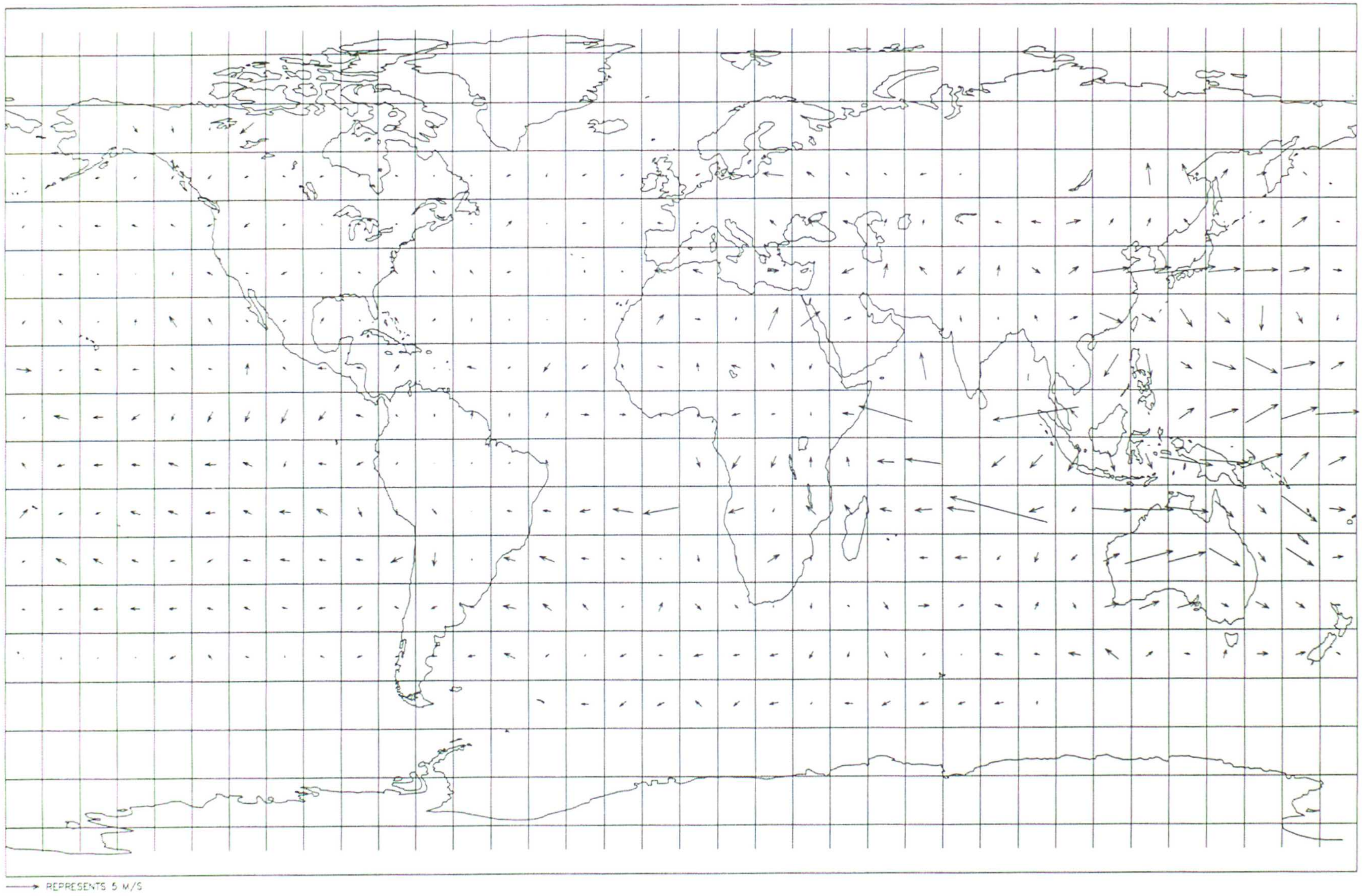
SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 401-700 HPA

FIGURE 17

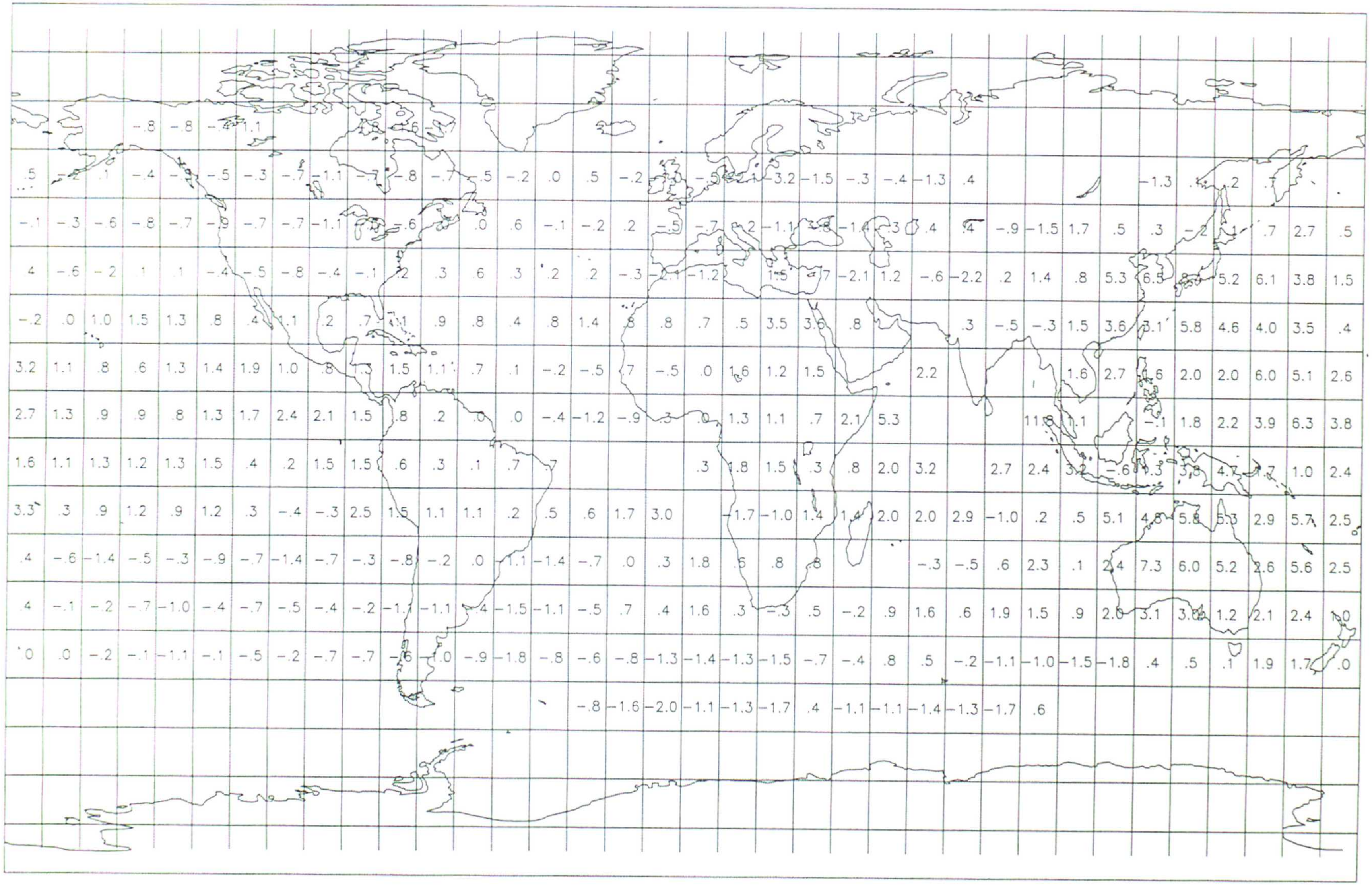
MAY 1999

ALL OBSERVATIONS

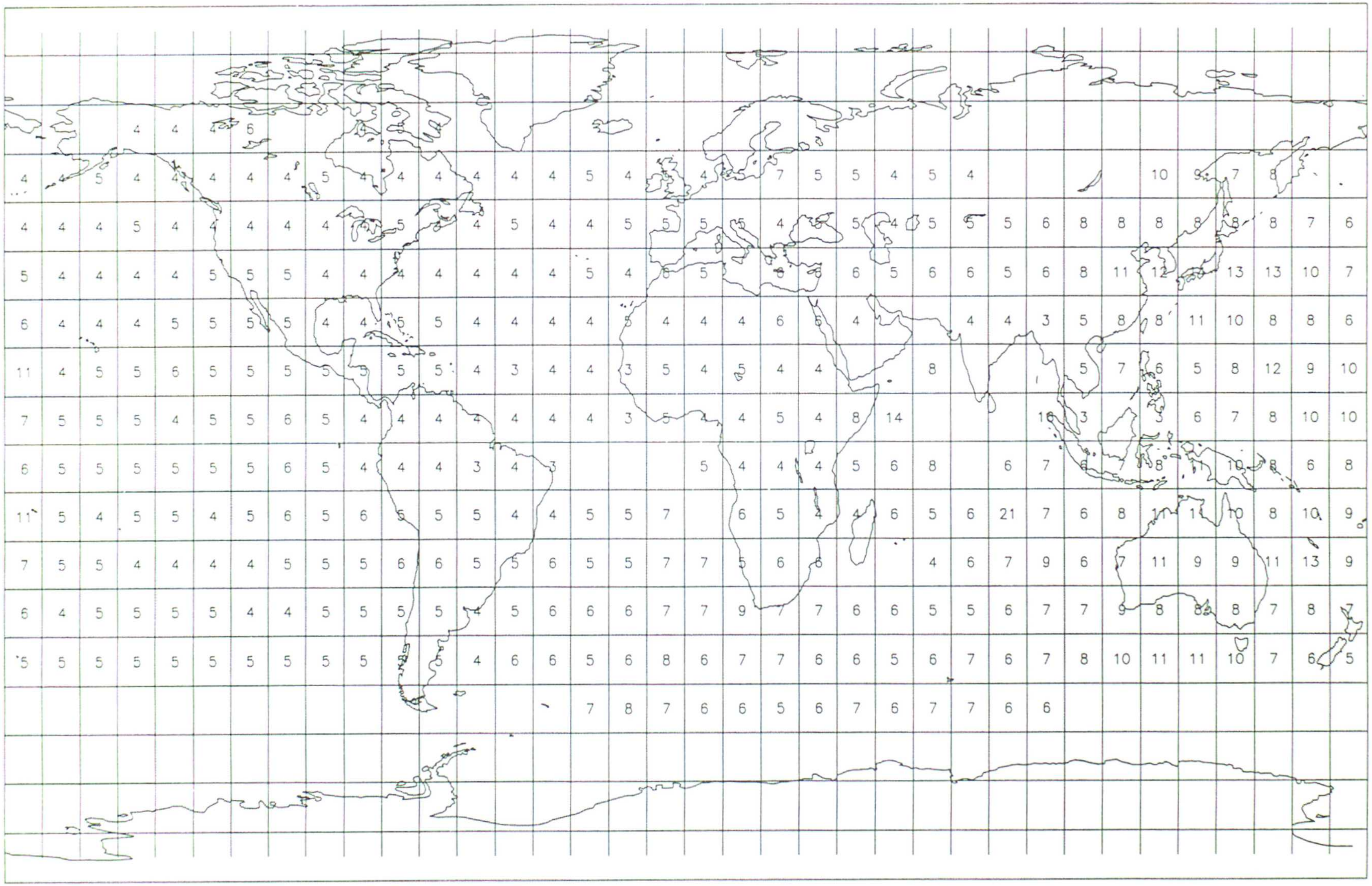
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT


REPRESENTS 5 M/S

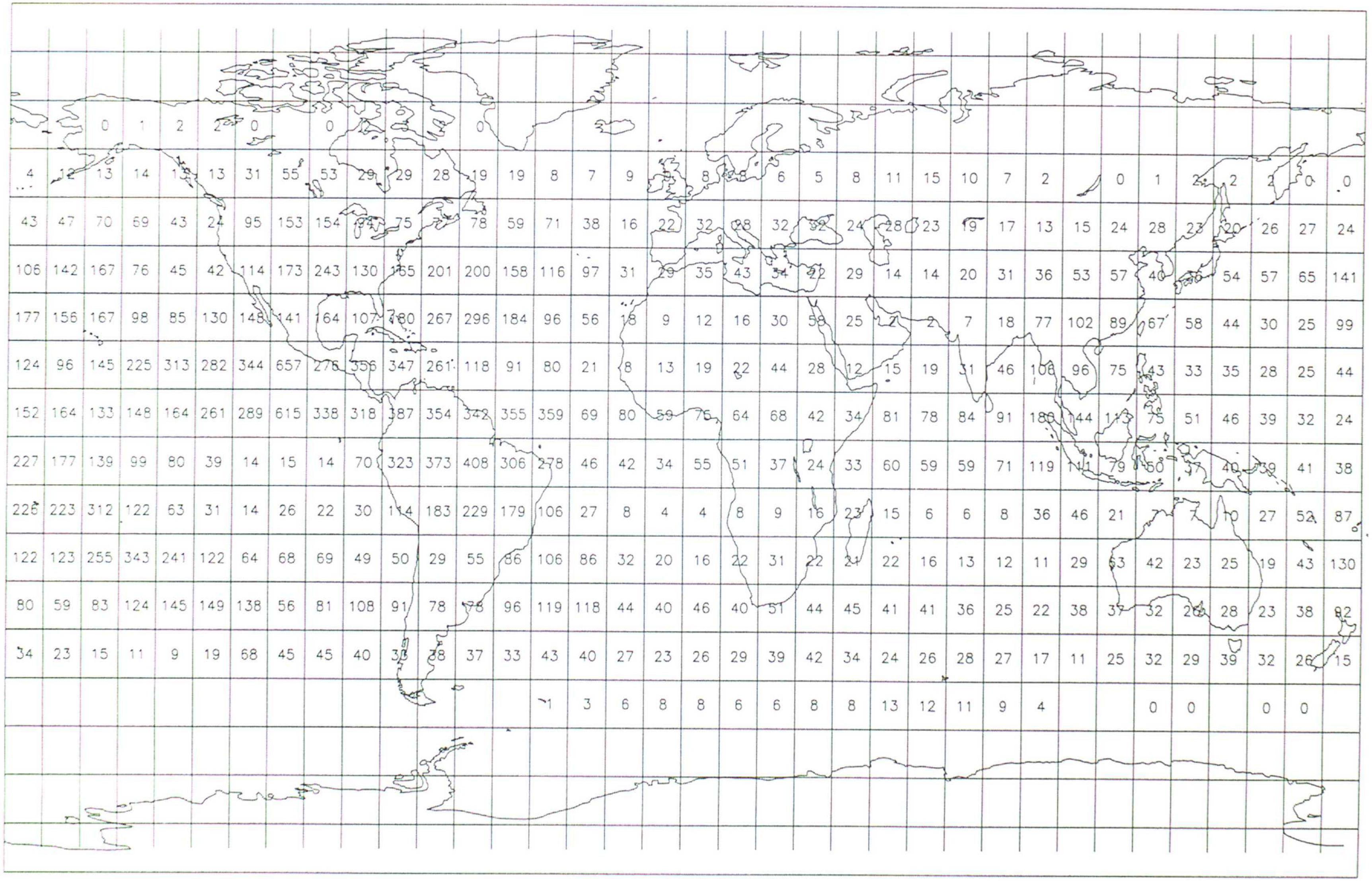
SATOBS : MEAN O–B SPEED DIFFERENCES (M/S) BETWEEN 401 AND 700 HPA FIGURE 18
MAY 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


-.8 -.8 -.4 1.1 .8 -.6 -.7
.5 -.2 .1 -.4 -.5 -.3 -.7 -1.1 -.7 -.8 -.7 -.5 -.2 .0 .5 -.2 -.5 -2.1 -3.2 -1.5 -.3 -.4 -1.3 .4 -1.3 .1 .2 .7
-.1 -.3 -.6 -.8 -.7 -.9 -.7 -.7 -1.1 -.6 .0 .6 -.1 -.2 .2 -.5 -.7 -.2 -1.1 -.8 -1.4 -.3 .4 .4 -.9 -1.5 1.7 .5 .3 -.2 .1 .7 2.7 .5
.4 -.6 -.2 .1 .1 -.4 -.5 -.8 -.4 -.1 .2 .3 .6 .3 .2 .2 -.3 -2.1 -1.2 1.5 -.7 -2.1 1.2 -.6 -2.2 .2 1.4 .8 5.3 6.5 .8 5.2 6.1 3.8 1.5
-.2 .0 1.0 1.5 1.3 .8 .4 1.1 .2 .7 .1 .9 .8 .4 .8 1.4 .8 .8 .7 .5 3.5 3.6 .8 .3 -.5 -.3 1.5 3.6 3.1 5.8 4.6 4.0 3.5 .4
3.2 1.1 .8 .6 1.3 1.4 1.9 1.0 .8 1.3 1.5 1.1 .7 .1 -.2 -.5 .7 -.5 .0 1.6 1.2 1.5 2.2 1.6 2.7 1.6 2.0 2.0 6.0 5.1 2.6
2.7 1.3 .9 .9 .8 1.3 1.7 2.4 2.1 1.5 .8 .2 .0 .0 -.4 -1.2 -.9 .3 .0 1.3 1.1 .7 2.1 5.3 11.8 1.1 -.1 1.8 2.2 3.9 6.3 3.8
1.6 1.1 1.3 1.2 1.3 1.5 .4 .2 1.5 1.5 .6 .3 .1 .7 .7 .3 1.8 1.5 .3 .8 2.0 3.2 2.7 2.4 3.2 -.6 1.3 3.8 4.7 1.7 1.0 2.4
3.3 .3 .9 1.2 .9 1.2 .3 -.4 -.3 2.5 1.5 1.1 1.1 .2 .5 .6 1.7 3.0 -1.7 -1.0 1.4 1.4 2.0 2.0 2.9 -1.0 .2 .5 5.1 4.8 5.8 5.3 2.9 5.7 2.5
.4 -.6 -1.4 -.5 -.3 -.9 -.7 -1.4 -.7 -.3 -.8 -.2 .0 -1.1 -1.4 -.7 .0 .3 1.8 .6 .8 .8 -.3 -.5 .6 2.3 .1 2.4 7.3 6.0 5.2 2.6 5.6 2.5
.4 -.1 -.2 -.7 -1.0 -.4 -.7 -.5 -.4 -.2 -1.1 -1.1 -.4 -1.5 -1.1 -.5 .7 .4 1.6 .3 -.3 .5 -.2 .9 1.6 .6 1.9 1.5 .9 2.0 3.1 3.6 1.2 2.1 2.4 1.0
.0 .0 -.2 -.1 -1.1 -.1 -.5 -.2 -.7 -.7 -.6 -1.0 -.9 -1.8 -.8 -.6 -.8 -1.3 -1.4 -1.3 -1.5 -.7 -.4 .8 .5 -.2 -1.1 -1.0 -1.5 -1.8 .4 .5 .1 1.9 1.7 .0
-.8 -1.6 -2.0 -1.1 -1.3 -1.7 .4 -1.1 -1.1 -1.4 -1.3 -1.7 .6

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 401 AND 700 HPA FIGURE 19
MAY 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT



AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 101 AND 400 HPA FIGURE 20
MAY 1999



		0	1	2	2	0		0				0																							
4	12	13	14	13	13	31	55	53	29	29	28	19	19	8	7	9	9	8	8	6	5	8	11	15	10	7	2		0	1	2	2	2	0	0
43	47	70	69	43	24	95	153	154	94	75	7	78	59	71	38	16	22	32	28	32	32	24	28	23	19	17	13	15	24	28	23	20	26	27	24
106	142	167	76	45	42	114	173	243	130	155	201	200	158	116	97	31	29	35	43	34	22	29	14	14	20	31	36	53	57	40	46	54	57	65	141
177	156	167	98	85	130	148	141	164	107	180	267	296	184	96	56	18	9	12	16	30	58	25	2	2	7	18	77	102	89	67	58	44	30	25	99
124	96	145	225	313	282	344	657	276	356	347	261	118	91	80	21	8	13	19	22	44	28	12	15	19	31	46	106	96	75	43	33	35	28	25	44
152	164	133	148	164	261	289	615	338	318	387	354	342	355	359	69	80	59	75	64	68	42	34	81	78	84	91	180	144	113	75	51	46	39	32	24
227	177	139	99	80	39	14	15	14	70	323	373	408	306	278	46	42	34	55	51	37	24	33	60	59	59	71	119	111	79	50	37	40	39	41	38
226	223	312	122	63	31	14	26	22	30	114	183	229	179	106	27	8	4	4	8	9	16	23	15	6	6	8	36	46	21	7	7	10	27	52	87
122	123	255	343	241	122	64	68	69	49	50	29	55	86	106	86	32	20	16	22	31	22	21	22	16	13	12	11	29	63	42	23	25	19	43	130
80	59	83	124	145	149	138	56	81	108	91	78	78	96	119	118	44	40	46	40	51	44	45	41	41	36	25	22	38	37	32	26	28	23	38	82
34	23	15	11	9	19	68	45	45	40	33	38	37	33	43	40	27	23	26	29	39	42	34	24	26	28	27	17	11	25	32	29	39	32	26	15
														1	3	6	8	8	6	6	8	8	13	12	11	9	4			0	0		0	0	

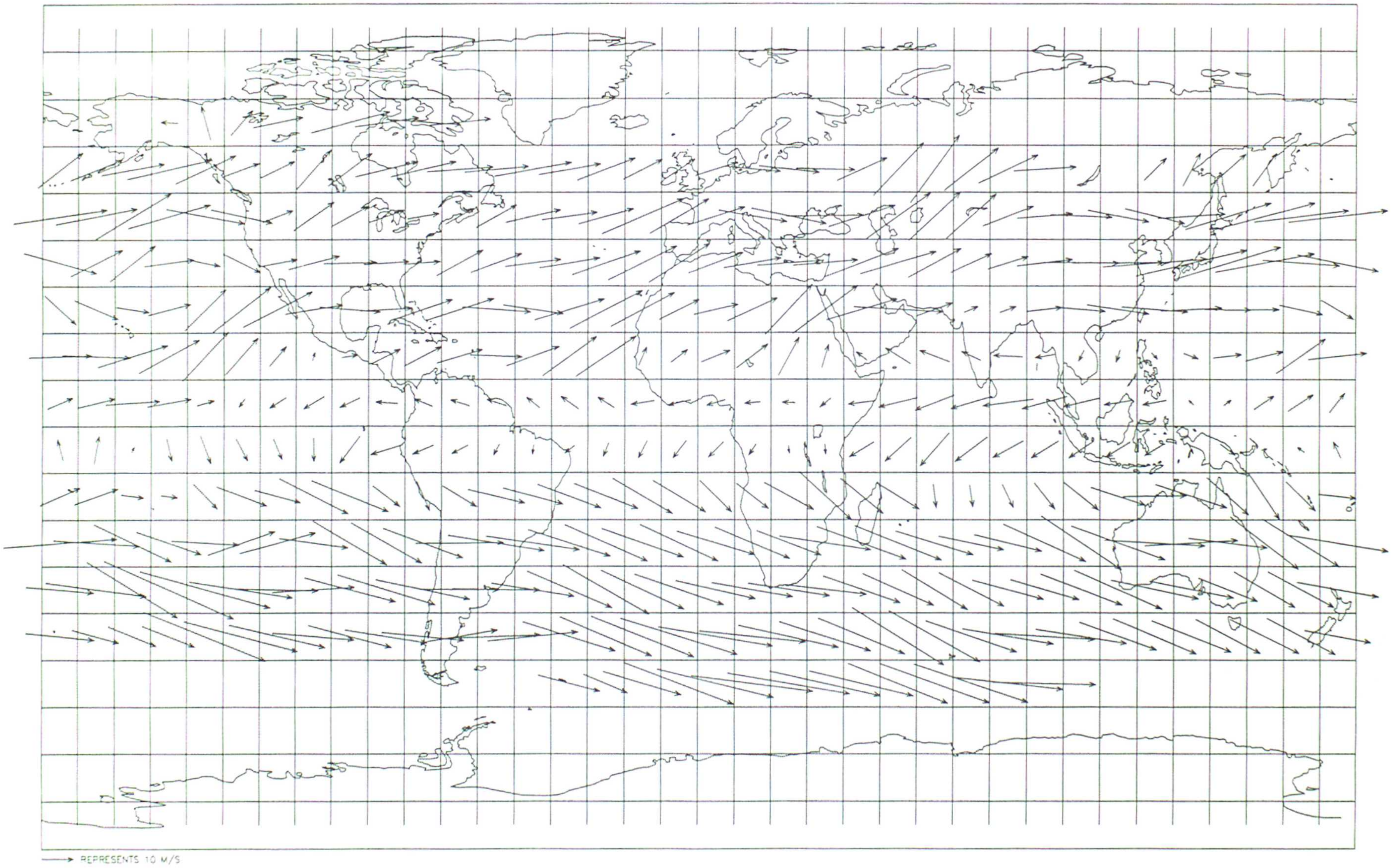
SATOB METEOSAT W/V VECTOR MEAN WINDS BETWEEN 101–400 HPA

FIGURE 21

MAY 1999

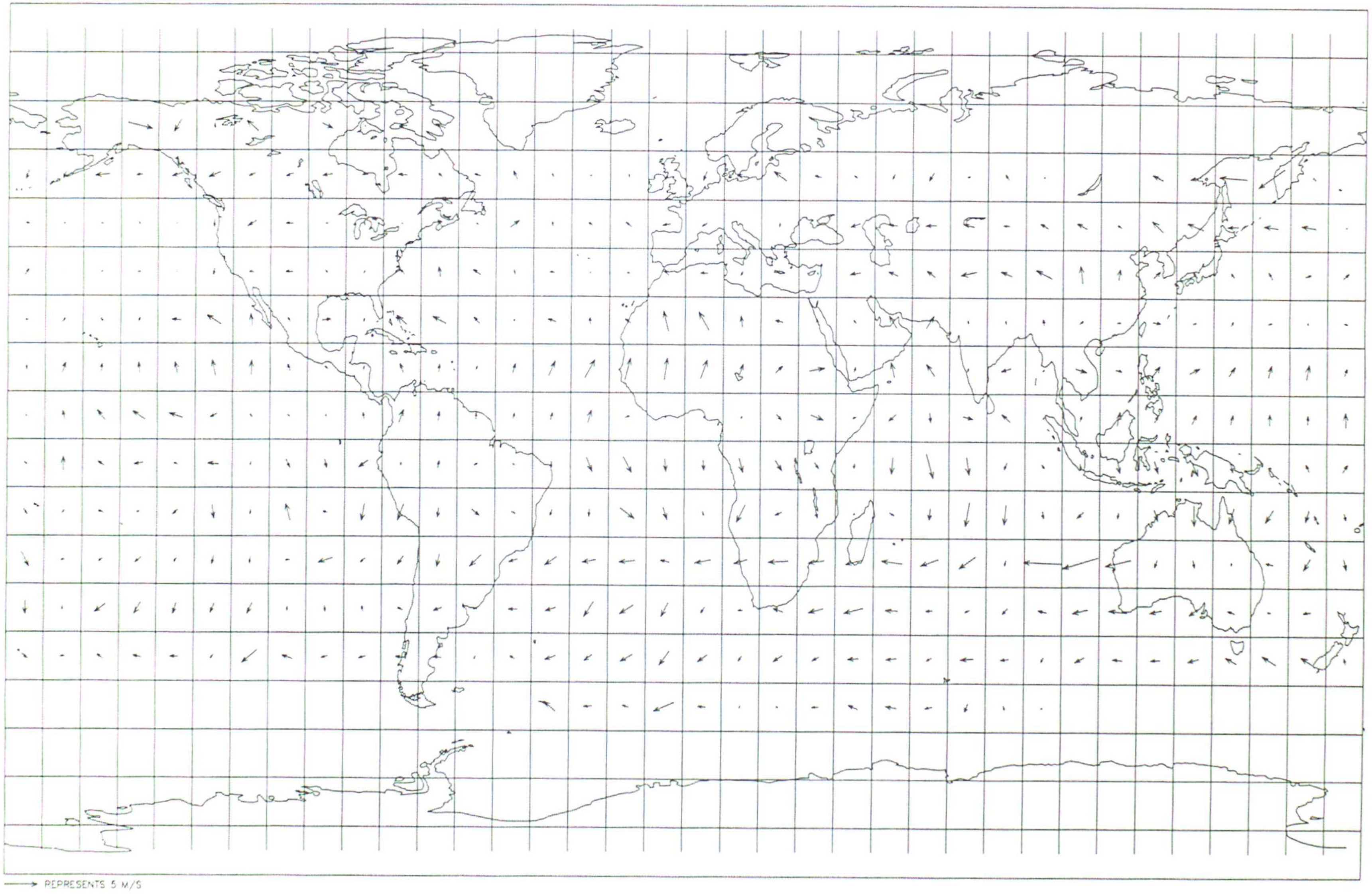
ALL OBSERVATIONS

ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT

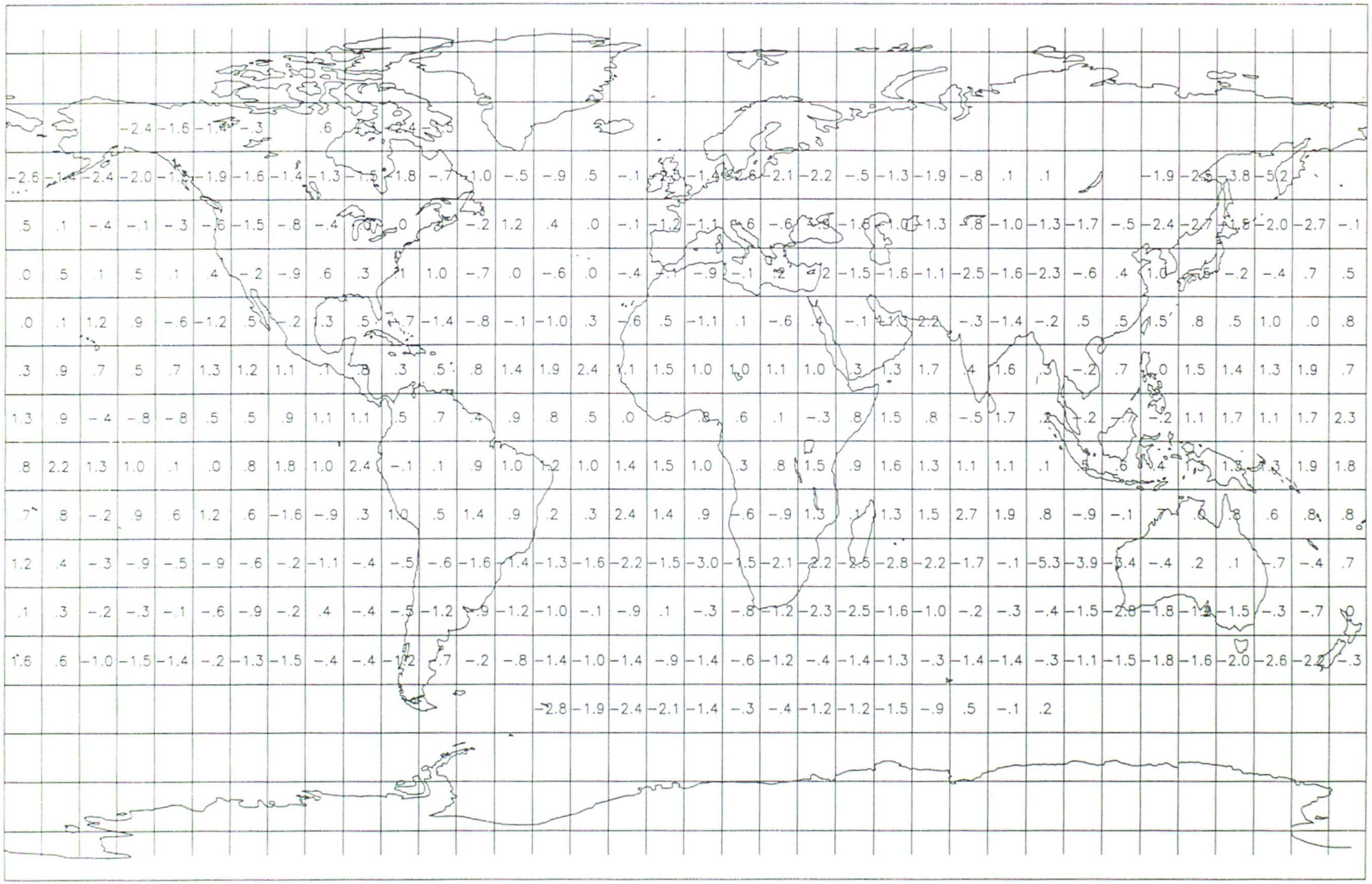

REPRESENTS 10 M/S

SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 101–400 HPA
MAY 1999
ALL OBSERVATIONS
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT

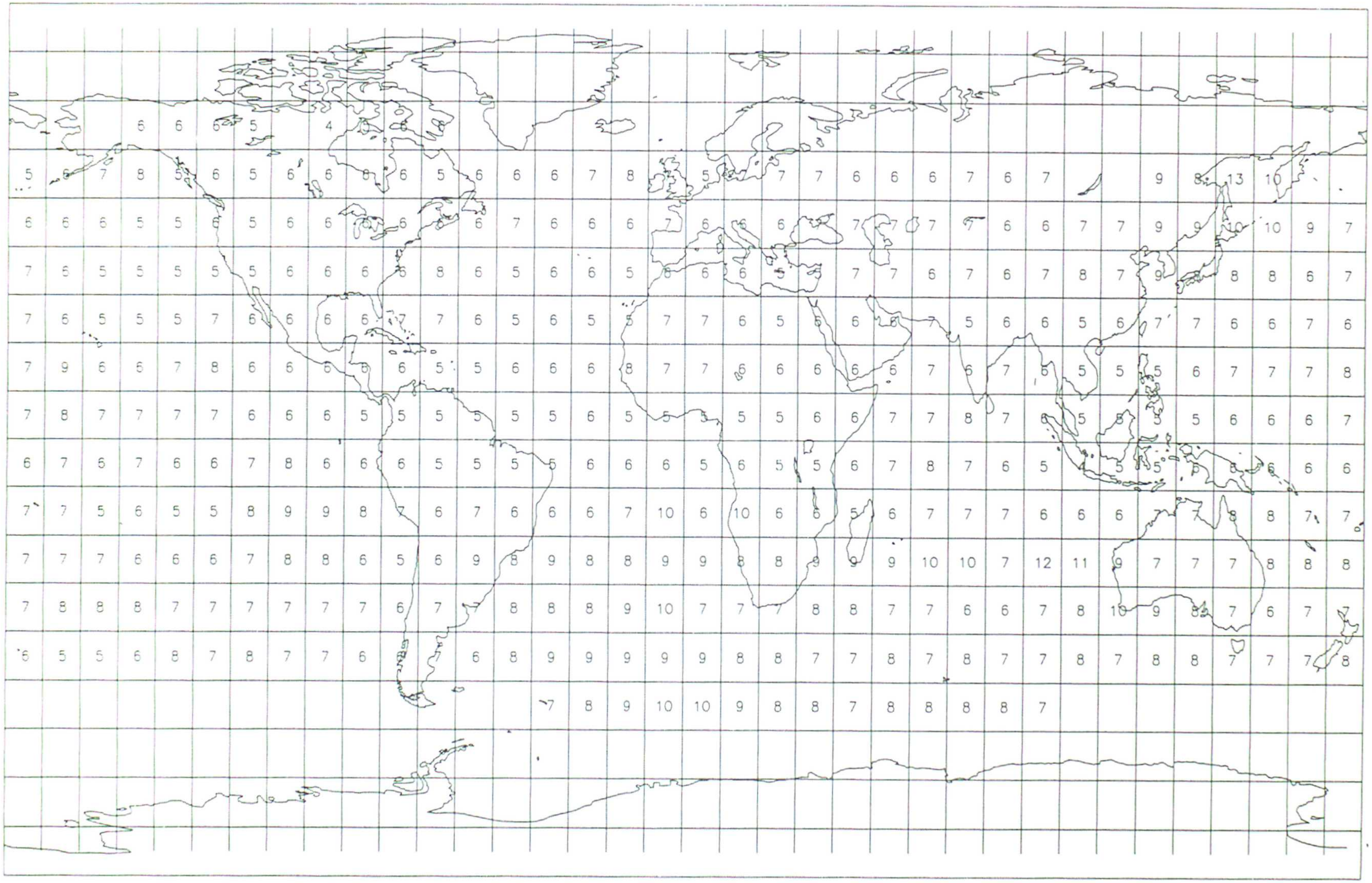
FIGURE 22


→ REPRESENTS 5 M/S

SATOBS : MEAN O–B SPEED DIFFERENCES (M/S) BETWEEN 101 AND 400 HPA FIGURE 23
MAY 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


-2.4 -1.6 -1.4 -.3 .6 -2.4
-2.6 -1.4 -2.4 -2.0 -1.9 -1.6 -1.4 -1.3 -1.5 -1.8 -.7 -1.0 -.5 -.9 .5 -.1 -2.5 -1.4 -2.6 -2.1 -2.2 -.5 -1.3 -1.9 -.8 .1 .1 -1.9 -2.5 -3.8 -5.2
.5 .1 -.4 -.1 -.3 -.6 -1.5 -.8 -.4 .0 .0 -.2 1.2 .4 .0 -.1 -1.2 -1.1 -.6 -.6 -3.9 -1.6 -1.0 -1.3 -.8 -1.0 -1.3 -1.7 -.5 -2.4 -2.7 -1.8 -2.0 -2.7 -.1
.0 .5 .1 .5 .1 .4 -.2 -.9 .6 .3 .1 1.0 -.7 .0 -.6 .0 -.4 -.1 -.9 -.1 .2 .2 -1.5 -1.6 -1.1 -2.5 -1.6 -2.3 -.6 .4 1.0 -.5 -.2 -.4 .7 .5
.0 .1 1.2 .9 -.6 -1.2 .5 -.2 1.3 .5 -.7 -1.4 -.8 -.1 -1.0 .3 -.6 .5 -1.1 .1 -.6 .4 -.1 1.3 2.2 -.3 -1.4 -.2 .5 .5 1.5 .8 .5 1.0 .0 .8
.3 .9 .7 .5 .7 1.3 1.2 1.1 .1 .8 .3 .5 .8 1.4 1.9 2.4 1.1 1.5 1.0 1.0 1.1 1.0 .3 1.3 1.7 .4 1.6 .3 -.2 .7 .0 1.5 1.4 1.3 1.9 .7
1.3 .9 -.4 -.8 -.8 .5 .5 .9 1.1 1.1 .5 .7 .4 .9 .8 .5 .0 .5 .8 .6 .1 -.3 .8 1.5 .8 -.5 1.7 .2 -.2 -.7 -.2 1.1 1.7 1.1 1.7 2.3
.8 2.2 1.3 1.0 .1 .0 .8 1.8 1.0 2.4 -.1 .1 .9 1.0 1.2 1.0 1.4 1.5 1.0 .3 .8 1.5 .9 1.6 1.3 1.1 1.1 .1 .5 .6 .4 1.3 1.3 1.3 1.9 1.8
.7 .8 -.2 .9 .6 1.2 .6 -1.6 -.9 .3 1.0 .5 1.4 .9 .2 .3 2.4 1.4 .9 -.6 -.9 1.3 .1 1.3 1.5 2.7 1.9 .8 -.9 -.1 .7 .0 .8 .6 .8 .8
1.2 .4 -.3 -.9 -.5 -.9 -.6 -.2 -1.1 -.4 -.5 -.6 -1.6 -1.4 -1.3 -1.6 -2.2 -1.5 -3.0 -1.5 -2.1 -2.2 -2.5 -2.8 -2.2 -1.7 -.1 -5.3 -3.9 -3.4 -.4 .2 .1 -.7 -.4 .7
.1 .3 -.2 -.3 -.1 -.6 -.9 -.2 .4 -.4 -.5 -1.2 -.9 -1.2 -1.0 -.1 -.9 .1 -.3 -.8 -1.2 -2.3 -2.5 -1.6 -1.0 -.2 -.3 -.4 -1.5 -2.8 -1.8 -1.2 -1.5 -.3 -.7 .0
1.6 .6 -1.0 -1.5 -1.4 -.2 -1.3 -1.5 -.4 -.4 -1.2 -.7 -.2 -.8 -1.4 -1.0 -1.4 -.9 -1.4 -.6 -1.2 -.4 -1.4 -1.3 -.3 -1.4 -1.4 -.3 -1.1 -1.5 -1.8 -1.6 -2.0 -2.6 -2.2 -.3
-2.8 -1.9 -2.4 -2.1 -1.4 -.3 -.4 -1.2 -1.2 -1.5 -.9 .5 -.1 .2

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 101 AND 400 HPA FIGURE 24
MAY 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT



MONITORING OF SATELLITE TEMPERATURES

MONITORING CENTRE: BRACKNELL

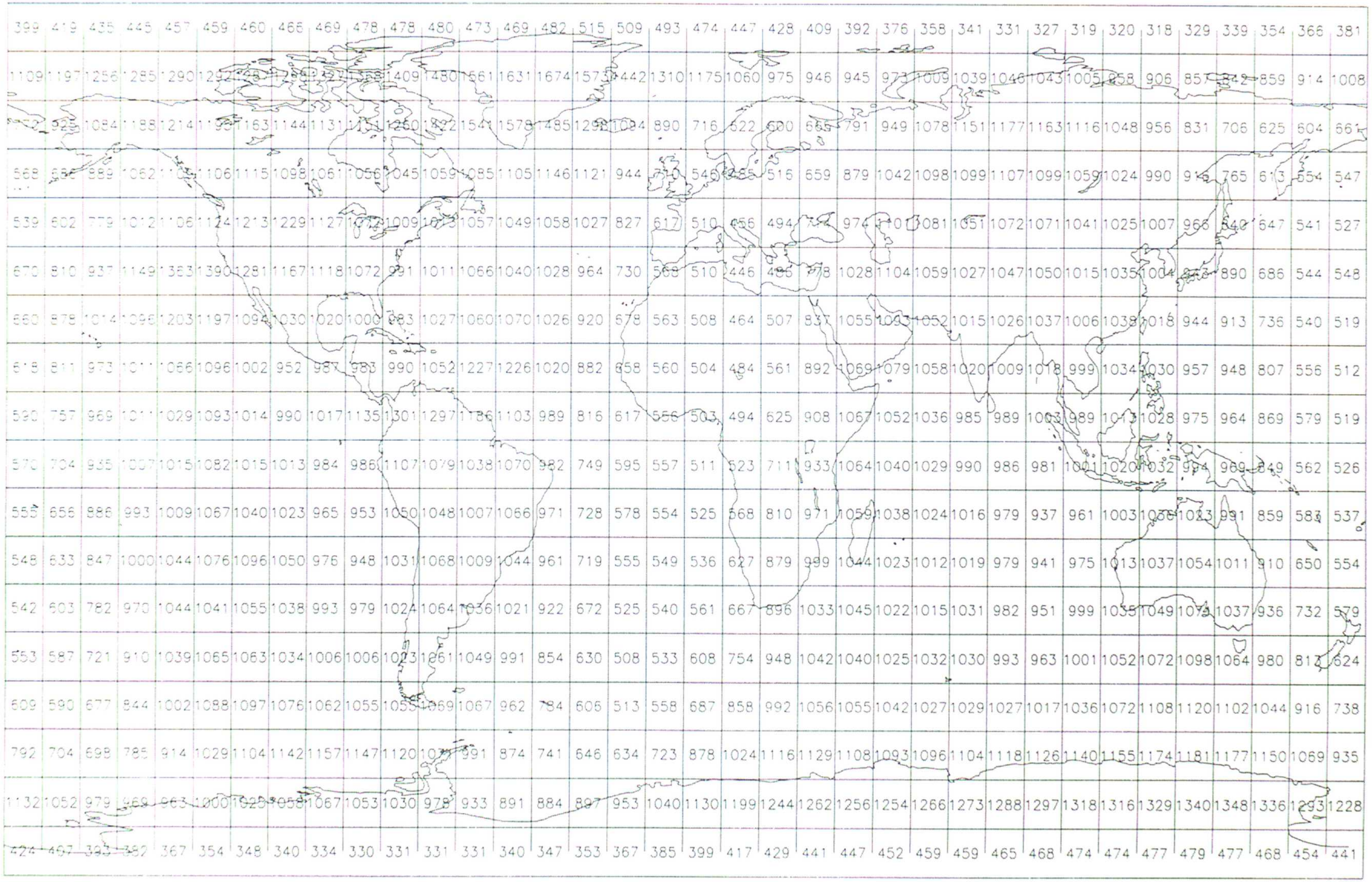
MONTH: May 1999

Monitoring procedures

Period	:One calendar month.
Data monitored	:Reports from NOAA-15.
Standard of comparison	:Background field from UKMO global model.
Selection Criteria	:All soundings.
Data Extracted	:Sounding channels (and approximate weighting function peaks, hPa) HIRS8 (Surface) HIRS15 (700) HIRS11 (500-700) HIRS4 (400) AMSUA5 (700) AMSUA7 (300) AMSUA9 (100) :Mean and standard deviation observation-minus-background brightness temperature differences

ATOVS : MEAN DAILY NUMBER OF OBSERVATIONS
MAY 1999
NOAA-15, USING ALL OBSERVATIONS

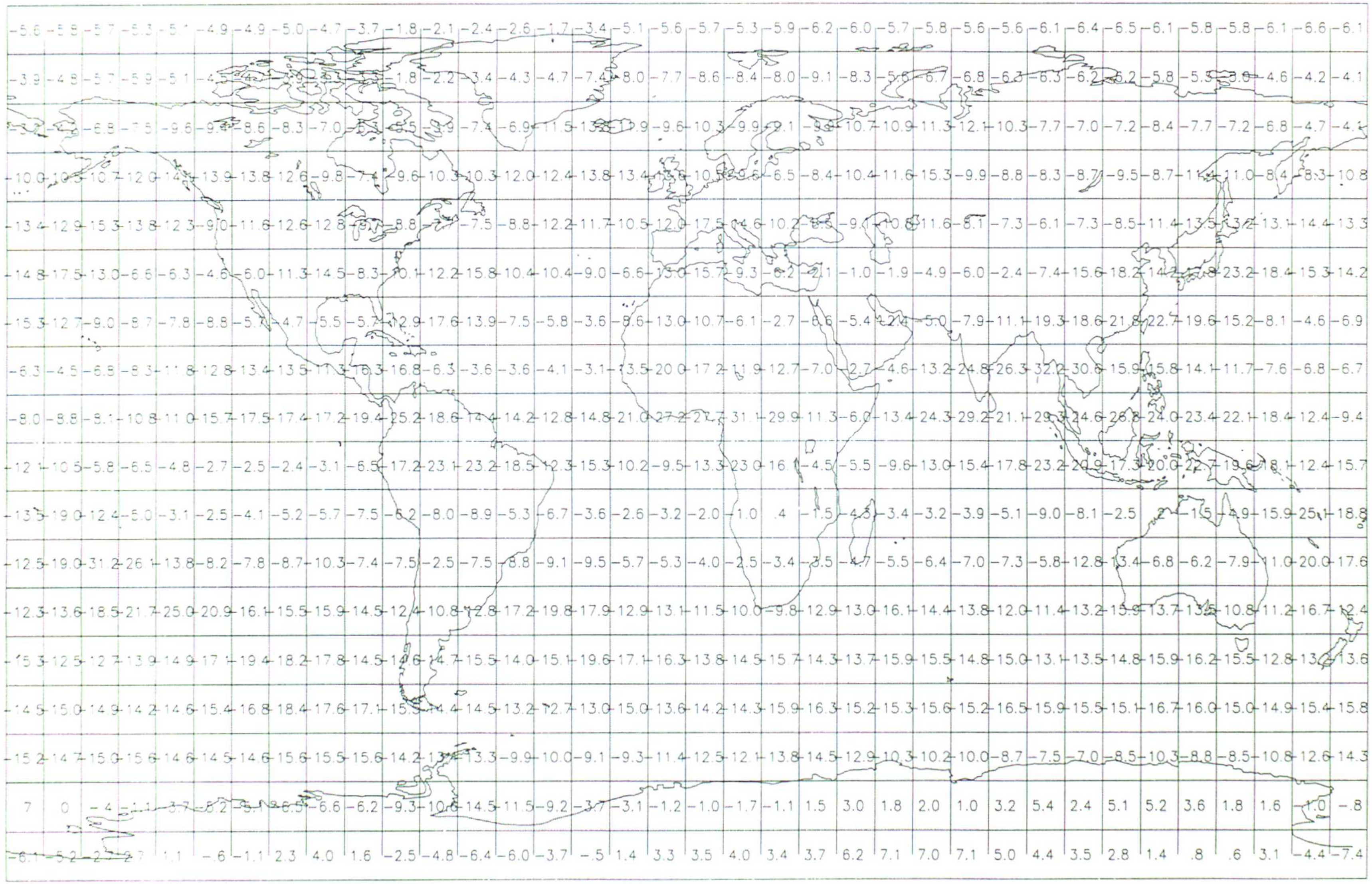
FIGURE 25



399	419	435	445	457	459	460	466	469	478	478	480	473	469	482	515	509	493	474	447	428	409	392	376	358	341	331	327	319	320	318	329	339	354	366	381
1109	1197	1256	1285	1290	1292	[illegible]	1298	1327	1358	1409	1480	1561	1631	1674	1573	1442	1310	1175	1060	975	946	945	973	1009	1039	1046	1043	1005	858	906	857	842	859	914	1008
[illegible]	925	1084	1188	1214	1193	1163	1144	1131	1151	1260	1322	1541	1578	1485	1298	1094	890	716	522	600	665	791	949	1078	1151	1177	1163	1116	1048	956	831	706	625	604	661
568	686	889	1062	[illegible]	1106	1115	1098	1061	1056	1045	1059	1085	1105	1146	1121	944	710	546	485	516	659	879	1042	1098	1099	1107	1099	1059	1024	990	916	765	613	554	547
539	602	779	1012	1106	1124	1213	1229	1127	1072	1009	1013	1057	1049	1058	1027	827	617	510	656	494	714	974	1101	1081	1051	1072	1071	1041	1025	1007	966	840	647	541	527
670	810	937	1149	1363	1390	1281	1167	1118	1072	991	1011	1066	1040	1028	964	730	568	510	446	486	778	1028	1104	1059	1027	1047	1050	1015	1035	1004	[illegible]	890	686	544	548
660	878	1014	1096	1203	1197	1094	1030	1020	1000	983	1027	1060	1070	1026	920	678	563	508	464	507	837	1055	1093	1052	1015	1026	1037	1006	1038	1018	944	913	736	540	519
618	811	973	1011	1066	1096	1002	952	987	983	990	1052	1227	1226	1020	882	658	560	504	484	561	892	1069	1079	1058	1020	1009	1018	999	1034	1030	957	948	807	556	512
590	757	969	1011	1029	1093	1014	990	1017	1135	1301	1297	1186	1103	989	816	617	556	503	494	625	908	1067	1052	1036	985	989	1003	989	1013	1028	975	964	869	579	519
570	704	935	1007	1015	1082	1015	1013	984	986	1107	1079	1038	1070	982	749	595	557	511	523	711	933	1064	1040	1029	990	986	981	1001	1020	1032	994	969	849	562	526
555	656	886	993	1009	1067	1040	1023	965	953	1050	1048	1007	1066	971	728	578	554	525	568	810	971	1059	1038	1024	1016	979	937	961	1003	1036	1023	991	859	583	537
548	633	847	1000	1044	1076	1096	1050	976	948	1031	1068	1009	1044	961	719	555	549	536	627	879	999	1044	1023	1012	1019	979	941	975	1013	1037	1054	1011	910	650	554
542	603	782	970	1044	1041	1055	1038	993	979	1024	1064	1036	1021	922	672	525	540	561	667	896	1033	1045	1022	1015	1031	982	951	999	1035	1049	1073	1037	936	732	579
553	587	721	910	1039	1065	1063	1034	1006	1006	1023	1061	1049	991	854	630	508	533	608	754	948	1042	1040	1025	1032	1030	993	963	1001	1052	1072	1098	1064	980	813	624
609	590	677	844	1002	1088	1097	1076	1062	1055	1055	1069	1067	962	784	605	513	558	687	858	992	1056	1055	1042	1027	1029	1027	1017	1036	1072	1108	1120	1102	1044	916	738
792	704	698	785	914	1029	1104	1142	1157	1147	1120	[illegible]	991	874	741	646	634	723	878	1024	1116	1129	1108	1093	1096	1104	1118	1126	1140	1155	1174	1181	1177	1150	1069	935
1132	1052	979	968	963	1000	1025	1058	1067	1053	1030	978	933	891	884	897	953	1040	1130	1199	1244	1262	1256	1254	1266	1273	1288	1297	1318	1316	1329	1340	1348	1336	1293	1228
424	497	393	382	367	354	348	340	334	330	331	331	331	340	347	353	367	385	399	417	429	441	447	452	459	459	465	468	474	474	477	479	477	468	454	441

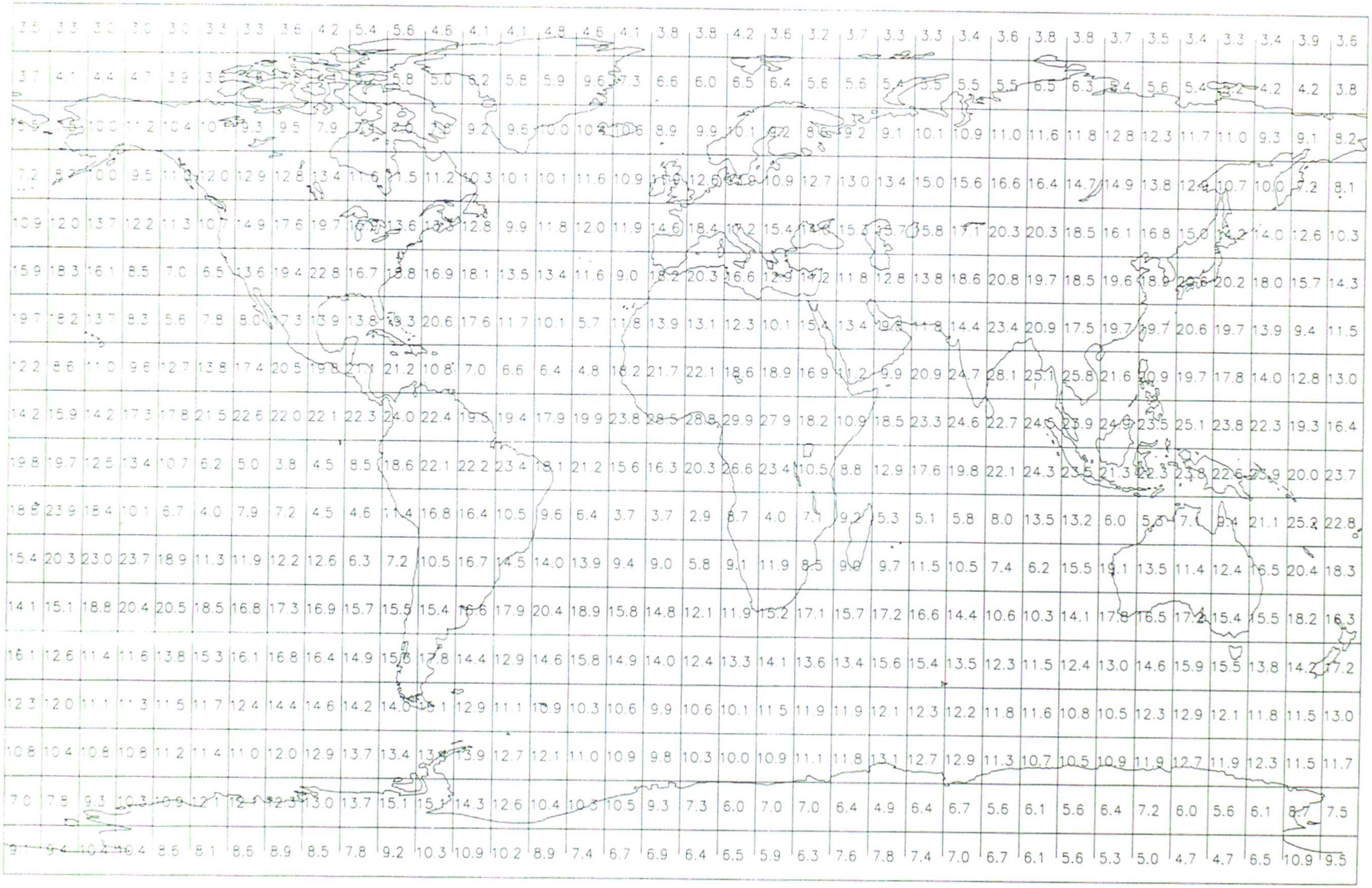
ATOVS : MEAN O-B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C)
MAY 1999 : HIRS8 channel (Surface)
NOAA-15, USING ALL OBSERVATIONS

FIGURE 26


-5.6 -5.9 -5.7 -5.3 -5.1 -4.9 -4.9 -5.0 -4.7 -3.7 -1.8 -2.1 -2.4 -2.6 -1.7 -3.4 -5.1 -5.6 -5.7 -5.3 -5.9 -6.2 -6.0 -5.7 -5.8 -5.6 -5.6 -6.1 -6.4 -6.5 -6.1 -5.8 -5.8 -6.1 -6.6 -6.1
-3.9 -4.8 -5.7 -5.9 -5.1 -4.5 [illegible] [illegible] [illegible] [illegible] -1.8 -2.2 -3.4 -4.3 -4.7 -7.4 -8.0 -7.7 -8.6 -8.4 -8.0 -9.1 -8.3 -5.6 -6.7 -6.8 -6.3 -6.3 -6.2 -6.2 -5.8 -5.3 -3.0 -4.6 -4.2 -4.1
-3.2 [illegible] -6.8 -7.5 -9.6 -9.4 -8.6 -8.3 -7.0 -6.3 -6.5 -3.9 -7.4 -6.9 -11.5 -13.8 -11.9 -9.6 -10.3 -9.9 -9.1 -9.9 -10.7 -10.9 -11.3 -12.1 -10.3 -7.7 -7.0 -7.2 -8.4 -7.7 -7.2 -6.8 -4.7 -4.1
-10.0 -10.5 -10.7 -12.0 [illegible] -13.9 -13.8 -12.6 -9.8 -7.4 -9.6 -10.3 -10.3 -12.0 -12.4 -13.8 -13.4 -13.6 -10.5 -9.6 -6.5 -8.4 -10.4 -11.6 -15.3 -9.9 -8.8 -8.3 -8.7 -9.5 -8.7 -11.4 -11.0 -8.4 -8.3 -10.8
-13.4 -12.9 -15.3 -13.8 -12.3 -9.0 -11.6 -12.6 -12.8 -9.7 -8.8 -7.7 -7.5 -8.8 -12.2 -11.7 -10.5 -12.0 -17.5 -14.6 -10.2 -8.5 -9.1 -10.8 -11.6 -8.1 -7.3 -6.1 -7.3 -8.5 -11.4 -13.5 -13.2 -13.1 -14.4 -13.3
-14.8 -17.5 -13.0 -6.6 -6.3 -4.6 -6.0 -11.3 -14.5 -8.3 -10.1 -12.2 -15.8 -10.4 -10.4 -9.0 -6.6 -13.0 -15.7 -9.3 -6.2 -2.1 -1.0 -1.9 -4.9 -6.0 -2.4 -7.4 -15.6 -18.2 -14.2 [illegible] -23.2 -18.4 -15.3 -14.2
-15.3 -12.7 -9.0 -8.7 -7.8 -8.8 -5.7 -4.7 -5.5 -5.7 -12.9 -17.6 -13.9 -7.5 -5.8 -3.6 -8.6 -13.0 -10.7 -6.1 -2.7 -6.6 -5.4 -12.4 -5.0 -7.9 -11.1 -19.3 -18.6 -21.8 -22.7 -19.6 -15.2 -8.1 -4.6 -6.9
-6.3 -4.5 -6.8 -8.3 -11.8 -12.8 -13.4 -13.5 -11.3 -16.3 -16.8 -6.3 -3.6 -3.6 -4.1 -3.1 -13.5 -20.0 -17.2 -11.9 -12.7 -7.0 -2.7 -4.6 -13.2 -24.8 -26.3 -32.2 -30.6 -15.9 -15.8 -14.1 -11.7 -7.6 -6.8 -6.7
-8.0 -8.8 -8.1 -10.8 -11.0 -15.7 -17.5 -17.4 -17.2 -19.4 -25.2 -18.6 -14.4 -14.2 -12.8 -14.8 -21.0 -27.2 -21.7 -31.1 -29.9 -11.3 -6.0 -13.4 -24.3 -29.2 -21.1 -29.3 -24.6 -26.8 -24.0 -23.4 -22.1 -18.4 -12.4 -9.4
-12.1 -10.5 -5.8 -6.5 -4.8 -2.7 -2.5 -2.4 -3.1 -6.5 -17.2 -23.1 -23.2 -18.5 -12.3 -15.3 -10.2 -9.5 -13.3 -23.0 -16.1 -4.5 -5.5 -9.6 -13.0 -15.4 -17.8 -23.2 -20.9 -17.3 -20.0 -22.7 -19.6 -18.1 -12.4 -15.7
-13.5 -19.0 -12.4 -5.0 -3.1 -2.5 -4.1 -5.2 -5.7 -7.5 -6.2 -8.0 -8.9 -5.3 -6.7 -3.6 -2.6 -3.2 -2.0 -1.0 .4 -1.5 -4.3 -3.4 -3.2 -3.9 -5.1 -9.0 -8.1 -2.5 .2 -1.5 -4.9 -15.9 -25.1 -18.8
-12.5 -19.0 -31.2 -26.1 -13.8 -8.2 -7.8 -8.7 -10.3 -7.4 -7.5 -2.5 -7.5 -8.8 -9.1 -9.5 -5.7 -5.3 -4.0 -2.5 -3.4 -3.5 -4.7 -5.5 -6.4 -7.0 -7.3 -5.8 -12.8 -13.4 -6.8 -6.2 -7.9 -11.0 -20.0 -17.6
-12.3 -13.6 -18.5 -21.7 -25.0 -20.9 -16.1 -15.5 -15.9 -14.5 -12.4 -10.8 -12.8 -17.2 -19.8 -17.9 -12.9 -13.1 -11.5 -10.0 -9.8 -12.9 -13.0 -16.1 -14.4 -13.8 -12.0 -11.4 -13.2 -15.9 -13.7 -13.5 -10.8 -11.2 -16.7 -12.4
-15.3 -12.5 -12.7 -13.9 -14.9 -17.1 -19.4 -18.2 -17.8 -14.5 -14.6 -14.7 -15.5 -14.0 -15.1 -19.6 -17.1 -16.3 -13.8 -14.5 -15.7 -14.3 -13.7 -15.9 -15.5 -14.8 -15.0 -13.1 -13.5 -14.8 -15.9 -16.2 -15.5 -12.8 [illegible] -13.6
-14.5 -15.0 -14.9 -14.2 -14.6 -15.4 -16.8 -18.4 -17.6 -17.1 -15.5 -14.4 -14.5 -13.2 -12.7 -13.0 -15.0 -13.6 -14.2 -14.3 -15.9 -16.3 -15.2 -15.3 -15.6 -15.2 -16.5 -15.9 -15.5 -15.1 -16.7 -16.0 -15.0 -14.9 -15.4 -15.8
-15.2 -14.7 -15.0 -15.6 -14.6 -14.5 -14.6 -15.6 -15.5 -15.6 -14.2 [illegible] -13.3 -9.9 -10.0 -9.1 -9.3 -11.4 -12.5 -12.1 -13.8 -14.5 -12.9 -10.3 -10.2 -10.0 -8.7 -7.5 -7.0 -8.5 -10.3 -8.8 -8.5 -10.8 -12.6 -14.3
7 0 -.4 -1.1 -3.7 -5.2 -5.1 -6.5 -6.6 -6.2 -9.3 -10.6 -14.5 -11.5 -9.2 -3.7 -3.1 -1.2 -1.0 -1.7 -1.1 1.5 3.0 1.8 2.0 1.0 3.2 5.4 2.4 5.1 5.2 3.6 1.8 1.6 -1.0 -.8
-6.1 -5.2 [illegible] -2.7 1.1 -.6 -1.1 2.3 4.0 1.6 -2.5 -4.8 -6.4 -6.0 -3.7 -.5 1.4 3.3 3.5 4.0 3.4 3.7 6.2 7.1 7.0 7.1 5.0 4.4 3.5 2.8 1.4 .8 .6 3.1 -4.4 -7.4

ATOVS : SD O-B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C)
MAY 1999 : HIRS8 channel (Surface)
NOAA-15. USING ALL OBSERVATIONS

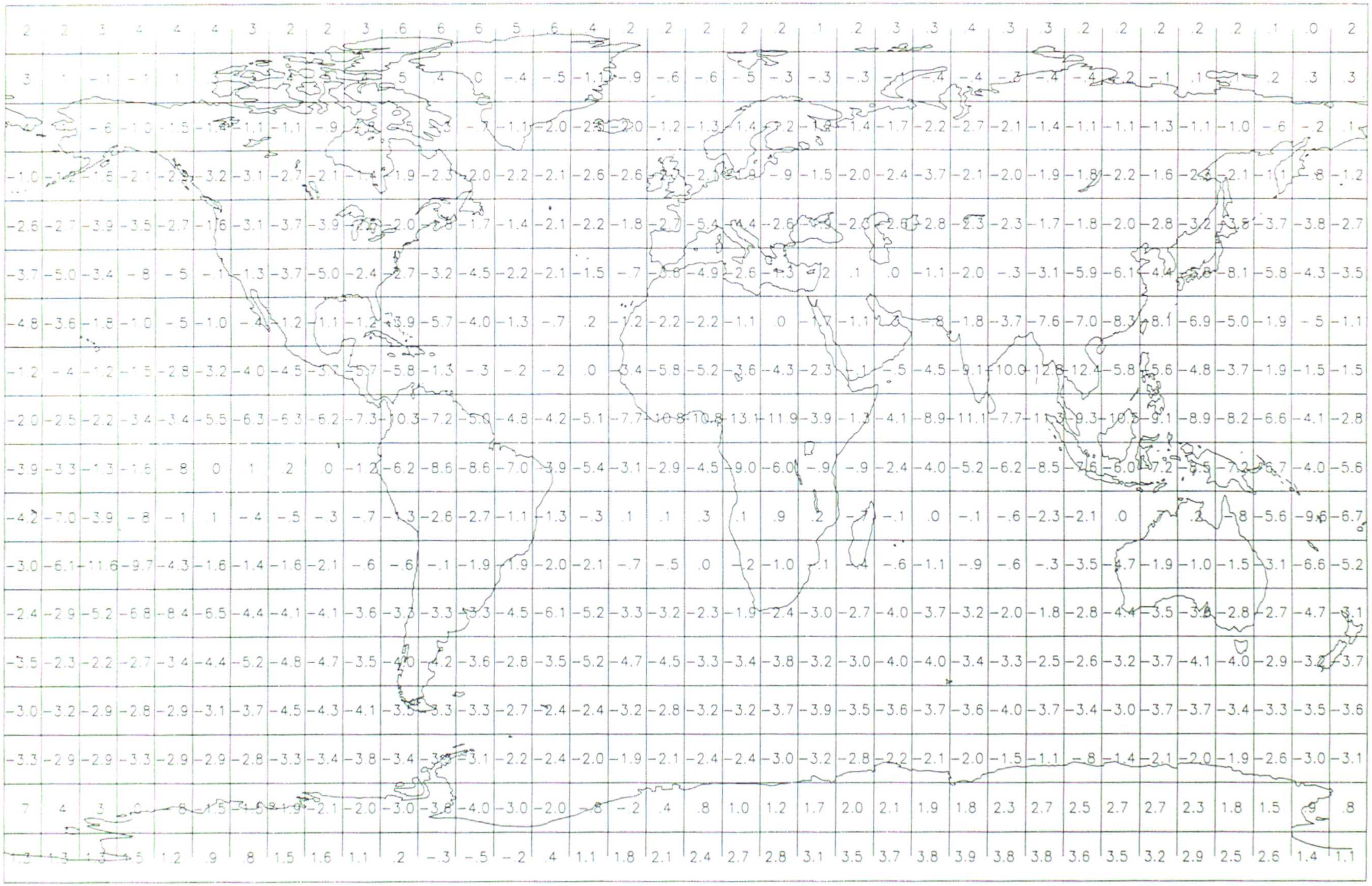
FIGURE 27



ATOVS : MEAN O-B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C)

FIGURE 28

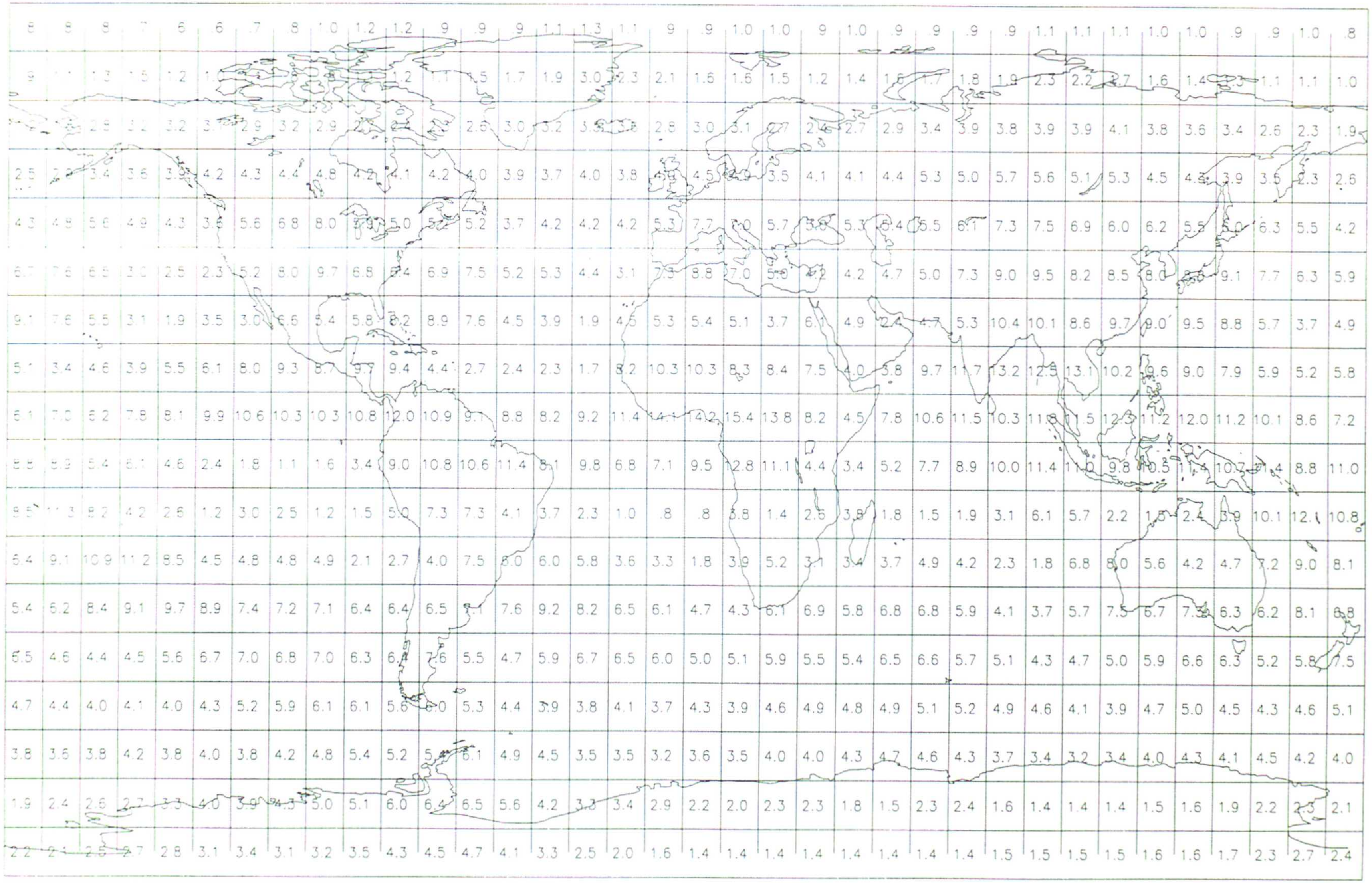
MAY 1999 : HIRS15 Channel (700 hPa)
NOAA-15, USING ALL OBSERVATIONS



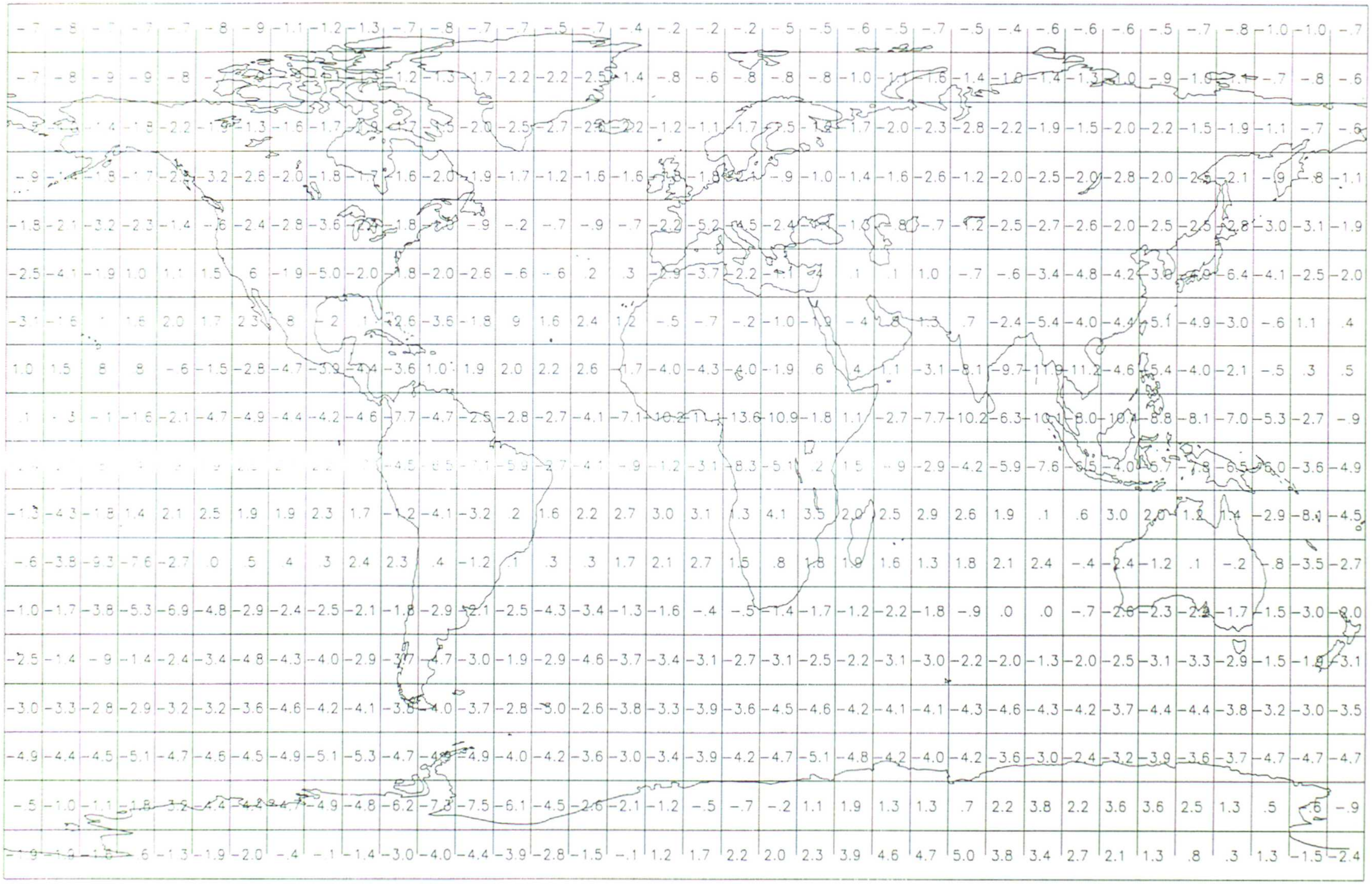
.2	.2	.3	.4	.4	.4	.3	.2	.2	.3	.6	.6	.6	.5	.6	.4	.2	.2	.2	.2	.2	.1	.2	.3	.3	.4	.3	.3	.2	.2	.2	.2	.2	.1	.0	.2
.3	.1	-.1	-.1	.1	[illegible]	.3	.4	.5	.4	.5	.4	0	-.4	-.5	-1.1	-.9	-.6	-.6	-.5	-.3	-.3	-.3	-.1	-.4	-.4	-.3	-.4	-.4	-.2	-.1	.1	.1	.2	.3	.3
[illegible]	[illegible]	-.6	-1.0	-1.5	-1.4	-1.1	-1.1	-.9	-.8	-.5	-.3	-.7	-1.1	-2.0	-2.3	-2.0	-1.2	-1.3	-1.4	-2.2	-1.9	-1.4	-1.7	-2.2	-2.7	-2.1	-1.4	-1.1	-1.1	-1.3	-1.1	-1.0	-.6	-.2	.1
-1.0	-1.2	-1.6	-2.1	-2.9	-3.2	-3.1	-2.7	-2.1	-1.4	-1.9	-2.3	-2.0	-2.2	-2.1	-2.6	-2.6	[illegible]	-2.1	-1.9	-.9	-1.5	-2.0	-2.4	-3.7	-2.1	-2.0	-1.9	-1.8	-2.2	-1.6	-2.3	-2.1	-1.1	-.8	-1.2
-2.6	-2.7	-3.9	-3.5	-2.7	-1.6	-3.1	-3.7	-3.9	-2.9	-2.0	-2.8	-1.7	-1.4	-2.1	-2.2	-1.8	-2.7	-5.4	-4.4	-2.6	-1.9	-2.3	-2.6	-2.8	-2.3	-2.3	-1.7	-1.8	-2.0	-2.8	-3.2	-3.8	-3.7	-3.8	-2.7
-3.7	-5.0	-3.4	-.8	-.5	-.1	-1.3	-3.7	-5.0	-2.4	-2.7	-3.2	-4.5	-2.2	-2.1	-1.5	-.7	-3.8	-4.9	-2.6	-1.3	.2	.1	.0	-1.1	-2.0	-.3	-3.1	-5.9	-6.1	-4.4	-5.8	-8.1	-5.8	-4.3	-3.5
-4.8	-3.6	-1.8	-1.0	-.5	-1.0	-.4	-1.2	-1.1	-1.2	-3.9	-5.7	-4.0	-1.3	-.7	.2	-1.2	-2.2	-2.2	-1.1	.0	-1.7	-1.1	-1.3	-.8	-1.8	-3.7	-7.6	-7.0	-8.3	-8.1	-6.9	-5.0	-1.9	-.5	-1.1
-1.2	-.4	-1.2	-1.5	-2.8	-3.2	-4.0	-4.5	-3.7	-5.7	-5.8	-1.3	-.3	-.2	-.2	.0	-3.4	-5.8	-5.2	-3.6	-4.3	-2.3	-.1	-.5	-4.5	-9.1	-10.0	-12.8	-12.4	-5.8	-5.6	-4.8	-3.7	-1.9	-1.5	-1.5
-2.0	-2.5	-2.2	-3.4	-3.4	-5.5	-6.3	-6.3	-6.2	-7.3	-10.3	-7.2	-5.0	-4.8	-4.2	-5.1	-7.7	-10.8	-10.8	-13.1	-11.9	-3.9	-1.3	-4.1	-8.9	-11.1	-7.7	-11.3	-9.3	-10.5	-9.1	-8.9	-8.2	-6.6	-4.1	-2.8
-3.9	-3.3	-1.3	-1.6	-.8	0	.1	.2	.0	-1.2	-6.2	-8.6	-8.6	-7.0	-3.9	-5.4	-3.1	-2.9	-4.5	-9.0	-6.0	-.9	-.9	-2.4	-4.0	-5.2	-6.2	-8.5	-7.6	-6.0	-7.2	-8.5	-7.2	-6.7	-4.0	-5.6
-4.2	-7.0	-3.9	-.8	-.1	.1	-.4	-.5	-.3	-.7	-1.3	-2.6	-2.7	-1.1	-1.3	-.3	.1	.1	.3	.1	.9	.2	-.7	-.1	.0	-.1	-.6	-2.3	-2.1	.0	.7	.2	-.8	-5.6	-9.6	-6.7
-3.0	-6.1	-11.6	-9.7	-4.3	-1.6	-1.4	-1.6	-2.1	-.6	-.6	-.1	-1.9	-1.9	-2.0	-2.1	-.7	-.5	.0	-.2	-1.0	.1	-.4	-.6	-1.1	-.9	-.6	-.3	-3.5	-4.7	-1.9	-1.0	-1.5	-3.1	-6.6	-5.2
-2.4	-2.9	-5.2	-6.8	-8.4	-6.5	-4.4	-4.1	-4.1	-3.6	-3.3	-3.3	-3.3	-4.5	-6.1	-5.2	-3.3	-3.2	-2.3	-1.9	-2.4	-3.0	-2.7	-4.0	-3.7	-3.2	-2.0	-1.8	-2.8	-4.4	-3.5	-3.8	-2.8	-2.7	-4.7	-3.1
-3.5	-2.3	-2.2	-2.7	-3.4	-4.4	-5.2	-4.8	-4.7	-3.5	-4.0	-4.2	-3.6	-2.8	-3.5	-5.2	-4.7	-4.5	-3.3	-3.4	-3.8	-3.2	-3.0	-4.0	-4.0	-3.4	-3.3	-2.5	-2.6	-3.2	-3.7	-4.1	-4.0	-2.9	-3.2	-3.7
-3.0	-3.2	-2.9	-2.8	-2.9	-3.1	-3.7	-4.5	-4.3	-4.1	-3.5	-3.3	-3.3	-2.7	-2.4	-2.4	-3.2	-2.8	-3.2	-3.2	-3.7	-3.9	-3.5	-3.6	-3.7	-3.6	-4.0	-3.7	-3.4	-3.0	-3.7	-3.7	-3.4	-3.3	-3.5	-3.6
-3.3	-2.9	-2.9	-3.3	-2.9	-2.9	-2.8	-3.3	-3.4	-3.8	-3.4	[illegible]	-3.1	-2.2	-2.4	-2.0	-1.9	-2.1	-2.4	-2.4	-3.0	-3.2	-2.8	-2.2	-2.1	-2.0	-1.5	-1.1	-.8	-1.4	-2.1	-2.0	-1.9	-2.6	-3.0	-3.1
.7	.4	.3	.0	-.8	-1.5	-1.5	-1.9	-2.1	-2.0	-3.0	-3.8	-4.0	-3.0	-2.0	-.8	-.2	.4	.8	1.0	1.2	1.7	2.0	2.1	1.9	1.8	2.3	2.7	2.5	2.7	2.7	2.3	1.8	1.5	.9	.8
1.3	1.3	1.3	1.5	1.2	.9	.8	1.5	1.6	1.1	.2	-.3	-.5	-.2	.4	1.1	1.8	2.1	2.4	2.7	2.8	3.1	3.5	3.7	3.8	3.9	3.8	3.8	3.6	3.5	3.2	2.9	2.5	2.6	1.4	1.1

ATOVS : SD O–B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C)
MAY 1999 : HIRS15 channel (700 hPa)
NOAA–15. USING ALL OBSERVATIONS

FIGURE 29

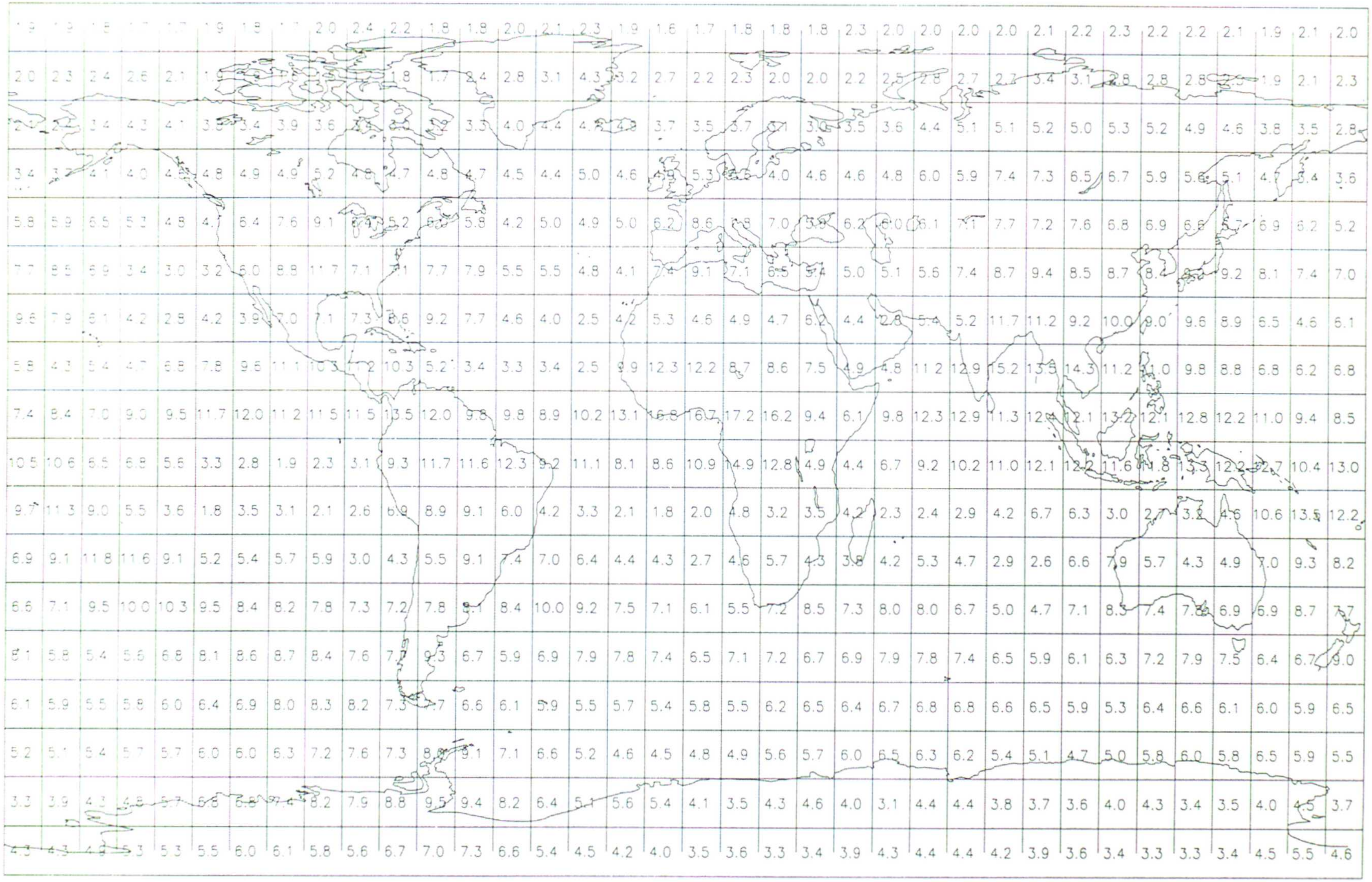

.8 .8 .8 .7 .6 .6 .7 .8 1.0 1.2 1.2 .9 .9 .9 1.1 1.3 1.1 .9 .9 1.0 1.0 .9 1.0 .9 .9 .9 .9 1.1 1.1 1.1 1.0 1.0 .9 .9 1.0 .8
.9 1.1 1.3 1.5 1.2 1.0 [illegible] [illegible] [illegible] [illegible] 1.2 1.1 1.5 1.7 1.9 3.0 2.3 2.1 1.6 1.6 1.5 1.2 1.4 1.6 1.7 1.8 1.9 2.3 2.2 2.7 1.6 1.4 [illegible] 1.1 1.1 1.0
[illegible] [illegible] 2.8 3.2 3.2 3.1 2.9 3.2 2.9 [illegible] [illegible] [illegible] 2.6 3.0 3.2 3.5 [illegible] 2.8 3.0 3.1 2.7 [illegible] 2.7 2.9 3.4 3.9 3.8 3.9 3.9 4.1 3.8 3.6 3.4 2.6 2.3 1.9
2.5 [illegible] 3.4 3.6 3.9 4.2 4.3 4.4 4.8 4.2 4.1 4.2 4.0 3.9 3.7 4.0 3.8 4.9 4.5 [illegible] 3.5 4.1 4.1 4.4 5.3 5.0 5.7 5.6 5.1 5.3 4.5 4.3 3.9 3.5 2.3 2.6
4.3 4.8 5.6 4.9 4.3 3.6 5.6 6.8 8.0 [illegible] 5.0 5.2 5.2 3.7 4.2 4.2 4.2 5.3 7.7 7.0 5.7 [illegible] 5.3 5.4 5.5 6.1 7.3 7.5 6.9 6.0 6.2 5.5 5.0 6.3 5.5 4.2
6.7 7.6 6.5 3.0 2.5 2.3 5.2 8.0 9.7 6.8 6.4 6.9 7.5 5.2 5.3 4.4 3.1 7.3 8.8 7.0 5.0 4.2 4.2 4.7 5.0 7.3 9.0 9.5 8.2 8.5 8.0 [illegible] 9.1 7.7 6.3 5.9
9.1 7.6 5.5 3.1 1.9 3.5 3.0 6.6 5.4 5.8 8.2 8.9 7.6 4.5 3.9 1.9 4.5 5.3 5.4 5.1 3.7 6.1 4.9 2.4 4.7 5.3 10.4 10.1 8.6 9.7 9.0 9.5 8.8 5.7 3.7 4.9
5.1 3.4 4.6 3.9 5.5 6.1 8.0 9.3 8.7 9.7 9.4 4.4 2.7 2.4 2.3 1.7 8.2 10.3 10.3 8.3 8.4 7.5 4.0 3.8 9.7 11.7 13.2 12.5 13.1 10.2 9.6 9.0 7.9 5.9 5.2 5.8
6.1 7.0 6.2 7.8 8.1 9.9 10.6 10.3 10.3 10.8 12.0 10.9 9.1 8.8 8.2 9.2 11.4 14.1 14.2 15.4 13.8 8.2 4.5 7.8 10.6 11.5 10.3 11.8 11.5 12.3 11.2 12.0 11.2 10.1 8.6 7.2
8.8 8.9 5.4 6.1 4.6 2.4 1.8 1.1 1.6 3.4 9.0 10.8 10.6 11.4 8.1 9.8 6.8 7.1 9.5 12.8 11.1 4.4 3.4 5.2 7.7 8.9 10.0 11.4 11.0 9.8 10.5 11.4 10.7 11.4 8.8 11.0
9.5 11.3 8.2 4.2 2.6 1.2 3.0 2.5 1.2 1.5 5.0 7.3 7.3 4.1 3.7 2.3 1.0 .8 .8 3.8 1.4 2.6 3.8 1.8 1.5 1.9 3.1 6.1 5.7 2.2 1.5 2.4 3.9 10.1 12.1 10.8
6.4 9.1 10.9 11.2 8.5 4.5 4.8 4.8 4.9 2.1 2.7 4.0 7.5 8.0 6.0 5.8 3.6 3.3 1.8 3.9 5.2 3.1 3.4 3.7 4.9 4.2 2.3 1.8 6.8 8.0 5.6 4.2 4.7 7.2 9.0 8.1
5.4 6.2 8.4 9.1 9.7 8.9 7.4 7.2 7.1 6.4 6.4 6.5 7.1 7.6 9.2 8.2 6.5 6.1 4.7 4.3 6.1 6.9 5.8 6.8 6.8 5.9 4.1 3.7 5.7 7.5 6.7 7.3 6.3 6.2 8.1 6.8
6.5 4.6 4.4 4.5 5.6 6.7 7.0 6.8 7.0 6.3 6.4 7.6 5.5 4.7 5.9 6.7 6.5 6.0 5.0 5.1 5.9 5.5 5.4 6.5 6.6 5.7 5.1 4.3 4.7 5.0 5.9 6.6 6.3 5.2 5.8 7.5
4.7 4.4 4.0 4.1 4.0 4.3 5.2 5.9 6.1 6.1 5.6 6.0 5.3 4.4 3.9 3.8 4.1 3.7 4.3 3.9 4.6 4.9 4.8 4.9 5.1 5.2 4.9 4.6 4.1 3.9 4.7 5.0 4.5 4.3 4.6 5.1
3.8 3.6 3.8 4.2 3.8 4.0 3.8 4.2 4.8 5.4 5.2 5.4 6.1 4.9 4.5 3.5 3.5 3.2 3.6 3.5 4.0 4.0 4.3 4.7 4.6 4.3 3.7 3.4 3.2 3.4 4.0 4.3 4.1 4.5 4.2 4.0
1.9 2.4 2.6 2.7 3.3 4.0 3.9 4.3 5.0 5.1 6.0 6.4 6.5 5.6 4.2 3.3 3.4 2.9 2.2 2.0 2.3 2.3 1.8 1.5 2.3 2.4 1.6 1.4 1.4 1.4 1.5 1.6 1.9 2.2 2.3 2.1
2.2 2.1 2.5 2.7 2.8 3.1 3.4 3.1 3.2 3.5 4.3 4.5 4.7 4.1 3.3 2.5 2.0 1.6 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.5 1.5 1.5 1.5 1.6 1.6 1.7 2.3 2.7 2.4

ATOVS : MEAN O-B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C) FIGURE 30
MAY 1999 : HIRS11 Channel (500-700 hPa)
NOAA-15, USING ALL OBSERVATIONS



ATOVS : SD O-B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C)
MAY 1999 : HIRS11 channel (500-700 hPa)
NOAA-15, USING ALL OBSERVATIONS

FIGURE 31



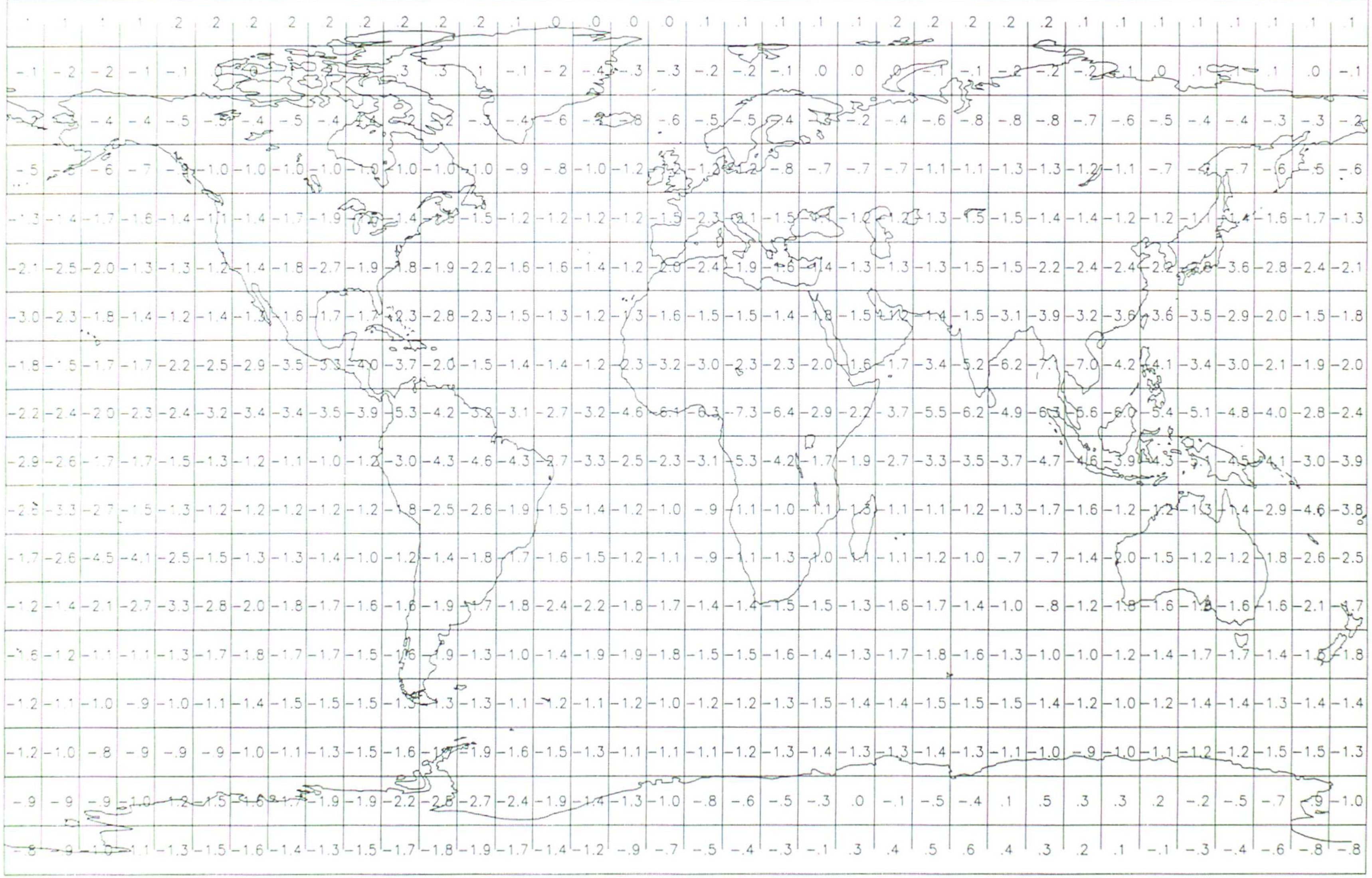
1.9	1.9	1.8	1.7	1.7	1.9	1.8	1.7	2.0	2.4	2.2	1.8	1.8	2.0	2.1	2.3	1.9	1.6	1.7	1.8	1.8	1.8	2.3	2.0	2.0	2.0	2.0	2.1	2.2	2.3	2.2	2.2	2.1	1.9	2.1	2.0
2.0	2.3	2.4	2.6	2.1	1.9	[illegible]	[illegible]	[illegible]	[illegible]	1.8	1.7	2.4	2.8	3.1	4.3	3.2	2.7	2.2	2.3	2.0	2.0	2.2	2.5	2.8	2.7	2.7	3.4	3.1	2.8	2.8	2.8	2.5	1.9	2.1	2.3
2.1	2.2	3.4	4.3	4.1	3.5	3.4	3.9	3.6	[illegible]	[illegible]	[illegible]	3.3	4.0	4.4	4.7	[illegible]	3.7	3.5	3.7	3.1	3.0	3.5	3.6	4.4	5.1	5.1	5.2	5.0	5.3	5.2	4.9	4.6	3.8	3.5	2.8
3.4	3.7	4.1	4.0	4.5	4.8	4.9	4.9	5.2	4.8	4.7	4.8	4.7	4.5	4.4	5.0	4.6	4.9	5.3	3.6	4.0	4.6	4.6	4.8	6.0	5.9	7.4	7.3	6.5	6.7	5.9	5.6	5.1	4.7	3.4	3.6
5.8	5.9	6.5	5.3	4.8	4.7	6.4	7.6	9.1	6.4	5.2	[illegible]	5.8	4.2	5.0	4.9	5.0	6.2	8.6	7.8	7.0	5.9	6.2	6.0	6.1	7.1	7.7	7.2	7.6	6.8	6.9	6.6	5.7	6.9	6.2	5.2
7.7	8.5	6.9	3.4	3.0	3.2	6.0	8.8	11.7	7.1	7.1	7.7	7.9	5.5	5.5	4.8	4.1	7.4	9.1	7.1	6.5	5.4	5.0	5.1	5.6	7.4	8.7	9.4	8.5	8.7	8.4	[illegible]	9.2	8.1	7.4	7.0
9.6	7.9	6.1	4.2	2.8	4.2	3.9	7.0	7.1	7.3	8.6	9.2	7.7	4.6	4.0	2.5	4.2	5.3	4.6	4.9	4.7	6.2	4.4	2.8	5.4	5.2	11.7	11.2	9.2	10.0	9.0	9.6	8.9	6.5	4.6	6.1
5.8	4.3	5.4	4.7	6.8	7.8	9.6	11.1	10.3	11.2	10.3	5.2	3.4	3.3	3.4	2.5	9.9	12.3	12.2	8.7	8.6	7.5	4.9	4.8	11.2	12.9	15.2	13.5	14.3	11.2	11.0	9.8	8.8	6.8	6.2	6.8
7.4	8.4	7.0	9.0	9.5	11.7	12.0	11.2	11.5	11.5	13.5	12.0	9.8	9.8	8.9	10.2	13.1	16.8	16.7	17.2	16.2	9.4	6.1	9.8	12.3	12.9	11.3	12.4	12.1	13.2	12.1	12.8	12.2	11.0	9.4	8.5
10.5	10.6	6.5	6.8	5.6	3.3	2.8	1.9	2.3	3.1	9.3	11.7	11.6	12.3	9.2	11.1	8.1	8.6	10.9	14.9	12.8	4.9	4.4	6.7	9.2	10.2	11.0	12.1	12.2	11.6	11.8	13.3	12.2	12.7	10.4	13.0
9.7	11.3	9.0	5.5	3.6	1.8	3.5	3.1	2.1	2.6	6.9	8.9	9.1	6.0	4.2	3.3	2.1	1.8	2.0	4.8	3.2	3.5	4.2	2.3	2.4	2.9	4.2	6.7	6.3	3.0	2.7	3.2	4.6	10.6	13.5	12.2
6.9	9.1	11.8	11.6	9.1	5.2	5.4	5.7	5.9	3.0	4.3	5.5	9.1	7.4	7.0	6.4	4.4	4.3	2.7	4.6	5.7	4.3	3.8	4.2	5.3	4.7	2.9	2.6	6.6	7.9	5.7	4.3	4.9	7.0	9.3	8.2
6.6	7.1	9.5	10.0	10.3	9.5	8.4	8.2	7.8	7.3	7.2	7.8	8.1	8.4	10.0	9.2	7.5	7.1	6.1	5.5	7.2	8.5	7.3	8.0	8.0	6.7	5.0	4.7	7.1	8.3	7.4	7.8	6.9	6.9	8.7	7.7
6.1	5.8	5.4	5.6	6.8	8.1	8.6	8.7	8.4	7.6	7.7	9.3	6.7	5.9	6.9	7.9	7.8	7.4	6.5	7.1	7.2	6.7	6.9	7.9	7.8	7.4	6.5	5.9	6.1	6.3	7.2	7.9	7.5	6.4	6.7	9.0
6.1	5.9	5.5	5.8	6.0	6.4	6.9	8.0	8.3	8.2	7.3	7.7	6.6	6.1	5.9	5.5	5.7	5.4	5.8	5.5	6.2	6.5	6.4	6.7	6.8	6.8	6.6	6.5	5.9	5.3	6.4	6.6	6.1	6.0	5.9	6.5
5.2	5.1	5.4	5.7	5.7	6.0	6.0	6.3	7.2	7.6	7.3	8.8	9.1	7.1	6.6	5.2	4.6	4.5	4.8	4.9	5.6	5.7	6.0	6.5	6.3	6.2	5.4	5.1	4.7	5.0	5.8	6.0	5.8	6.5	5.9	5.5
3.3	3.9	4.3	4.8	5.7	6.8	6.8	7.4	8.2	7.9	8.8	9.5	9.4	8.2	6.4	5.1	5.6	5.4	4.1	3.5	4.3	4.6	4.0	3.1	4.4	4.4	3.8	3.7	3.6	4.0	4.3	3.4	3.5	4.0	4.5	3.7
4.3	4.3	4.9	5.3	5.3	5.5	6.0	6.1	5.8	5.6	6.7	7.0	7.3	6.6	5.4	4.5	4.2	4.0	3.5	3.6	3.3	3.4	3.9	4.3	4.4	4.4	4.2	3.9	3.6	3.4	3.3	3.3	3.4	4.5	5.5	4.6

ATOVS : MEAN O-B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C)

FIGURE 32

MAY 1999 : HIRS4 channel (400 hPa)

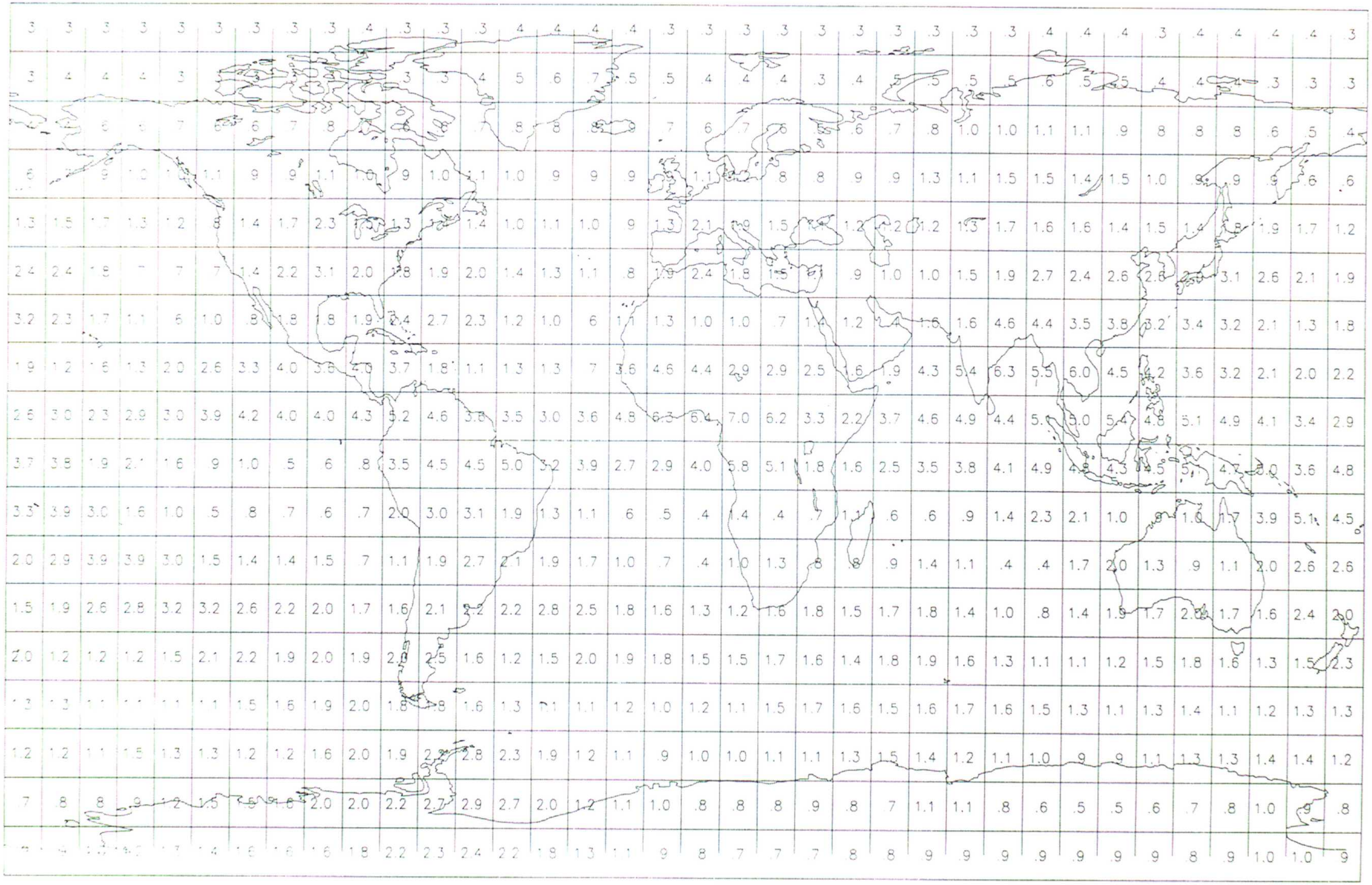
NOAA-15, USING ALL OBSERVATIONS



.1	.1	.1	.1	.2	.2	.2	.2	.2	.2	.2	.2	.2	.1	.0	.0	.0	.0	.1	.1	.1	.1	.1	.2	.2	.2	.2	.2	.1	.1	.1	.1	.1	.1	.1	.1
-.1	-.2	-.2	-.1	-.1	[illegible]	.0	.1	.2	[illegible]	.3	.3	.1	-.1	-.2	-.4	-.3	-.3	-.2	-.2	-.1	.0	.0	.0	-.1	-.1	-.2	-.2	-.2	.1	.0	.1	.1	.1	.0	-.1
-.2	-.3	-.4	-.4	-.5	-.5	-.4	-.5	-.4	-.4	-.2	-.2	-.3	-.4	-.6	[illegible]	-.8	-.6	-.5	-.5	-.4	-.3	-.2	-.4	-.6	-.8	-.8	-.8	-.7	-.6	-.5	-.4	-.4	-.3	-.3	-.2
-.5	-.5	-.6	-.7	-.9	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-.9	-.8	-1.0	-1.2	-1.2	-1.2	-1.2	-.8	-.7	-.7	-.7	-1.1	-1.1	-1.3	-1.3	-1.2	-1.1	-.7	-.4	-.7	-.6	-.5	-.6
-1.3	-1.4	-1.7	-1.6	-1.4	-1.1	-1.4	-1.7	-1.9	-2.0	-1.4	-2.5	-1.5	-1.2	-1.2	-1.2	-1.2	-1.5	-2.3	-2.1	-1.5	[illegible]	-1.2	-1.2	-1.3	-1.5	-1.5	-1.4	-1.4	-1.2	-1.2	-1.1	-1.4	-1.6	-1.7	-1.3
-2.1	-2.5	-2.0	-1.3	-1.3	-1.2	-1.4	-1.8	-2.7	-1.9	-1.8	-1.9	-2.2	-1.6	-1.6	-1.4	-1.2	-2.0	-2.4	-1.9	-1.6	-1.4	-1.3	-1.3	-1.3	-1.5	-1.5	-2.2	-2.4	-2.4	-2.2	[illegible]	-3.6	-2.8	-2.4	-2.1
-3.0	-2.3	-1.8	-1.4	-1.2	-1.4	-1.3	-1.6	-1.7	-1.7	-2.3	-2.8	-2.3	-1.5	-1.3	-1.2	-1.3	-1.6	-1.5	-1.5	-1.4	-1.8	-1.5	[illegible]	-1.4	-1.5	-3.1	-3.9	-3.2	-3.6	-3.6	-3.5	-2.9	-2.0	-1.5	-1.8
-1.8	-1.5	-1.7	-1.7	-2.2	-2.5	-2.9	-3.5	-3.3	-4.0	-3.7	-2.0	-1.5	-1.4	-1.4	-1.2	-2.3	-3.2	-3.0	-2.3	-2.3	-2.0	-1.6	-1.7	-3.4	-5.2	-6.2	-7.1	-7.0	-4.2	-4.1	-3.4	-3.0	-2.1	-1.9	-2.0
-2.2	-2.4	-2.0	-2.3	-2.4	-3.2	-3.4	-3.4	-3.5	-3.9	-5.3	-4.2	-3.2	-3.1	-2.7	-3.2	-4.6	-6.1	-6.3	-7.3	-6.4	-2.9	-2.2	-3.7	-5.5	-6.2	-4.9	-6.3	-5.6	-6.0	-5.4	-5.1	-4.8	-4.0	-2.8	-2.4
-2.9	-2.6	-1.7	-1.7	-1.5	-1.3	-1.2	-1.1	-1.0	-1.2	-3.0	-4.3	-4.6	-4.3	-2.7	-3.3	-2.5	-2.3	-3.1	-5.3	-4.2	-1.7	-1.9	-2.7	-3.3	-3.5	-3.7	-4.7	-4.6	-3.9	-4.3	-5.1	-4.5	-4.1	-3.0	-3.9
-2.5	-3.3	-2.7	-1.5	-1.3	-1.2	-1.2	-1.2	-1.2	-1.2	-1.8	-2.5	-2.6	-1.9	-1.5	-1.4	-1.2	-1.0	-.9	-1.1	-1.0	-1.1	-1.3	-1.1	-1.1	-1.2	-1.3	-1.7	-1.6	-1.2	-1.2	-1.3	-1.4	-2.9	-4.6	-3.8
-1.7	-2.6	-4.5	-4.1	-2.5	-1.5	-1.3	-1.3	-1.4	-1.0	-1.2	-1.4	-1.8	-1.7	-1.6	-1.5	-1.2	-1.1	-.9	-1.1	-1.3	-1.0	-1.1	-1.1	-1.2	-1.0	-.7	-.7	-1.4	-2.0	-1.5	-1.2	-1.2	-1.8	-2.6	-2.5
-1.2	-1.4	-2.1	-2.7	-3.3	-2.8	-2.0	-1.8	-1.7	-1.6	-1.6	-1.9	-1.7	-1.8	-2.4	-2.2	-1.8	-1.7	-1.4	-1.4	-1.5	-1.5	-1.3	-1.6	-1.7	-1.4	-1.0	-.8	-1.2	-1.8	-1.6	[illegible]	-1.6	-1.6	-2.1	-1.7
-1.6	-1.2	-1.1	-1.1	-1.3	-1.7	-1.8	-1.7	-1.7	-1.5	-1.6	-1.9	-1.3	-1.0	-1.4	-1.9	-1.9	-1.8	-1.5	-1.5	-1.6	-1.4	-1.3	-1.7	-1.8	-1.6	-1.3	-1.0	-1.0	-1.2	-1.4	-1.7	-1.7	-1.4	-1.5	-1.8
-1.2	-1.1	-1.0	-.9	-1.0	-1.1	-1.4	-1.5	-1.5	-1.5	-1.3	-1.3	-1.3	-1.1	-1.2	-1.1	-1.2	-1.0	-1.2	-1.2	-1.3	-1.5	-1.4	-1.4	-1.5	-1.5	-1.5	-1.4	-1.2	-1.0	-1.2	-1.4	-1.4	-1.3	-1.4	-1.4
-1.2	-1.0	-.8	-.9	-.9	-.9	-1.0	-1.1	-1.3	-1.5	-1.6	[illegible]	-1.9	-1.6	-1.5	-1.3	-1.1	-1.1	-1.1	-1.2	-1.3	-1.4	-1.3	-1.3	-1.4	-1.3	-1.1	-1.0	-.9	-1.0	-1.1	-1.2	-1.2	-1.5	-1.5	-1.3
-.9	-.9	-.9	-1.0	-1.2	-1.5	-1.6	-1.7	-1.9	-1.9	-2.2	-2.8	-2.7	-2.4	-1.9	-1.4	-1.3	-1.0	-.8	-.6	-.5	-.3	.0	-.1	-.5	-.4	.1	.5	.3	.3	.2	-.2	-.5	-.7	-.9	-1.0
-.8	-.9	-1.0	-1.1	-1.3	-1.5	-1.6	-1.4	-1.3	-1.5	-1.7	-1.8	-1.9	-1.7	-1.4	-1.2	-.9	-.7	-.5	-.4	-.3	-.1	.3	.4	.5	.6	.4	.3	.2	.1	-.1	-.3	-.4	-.6	-.8	-.8

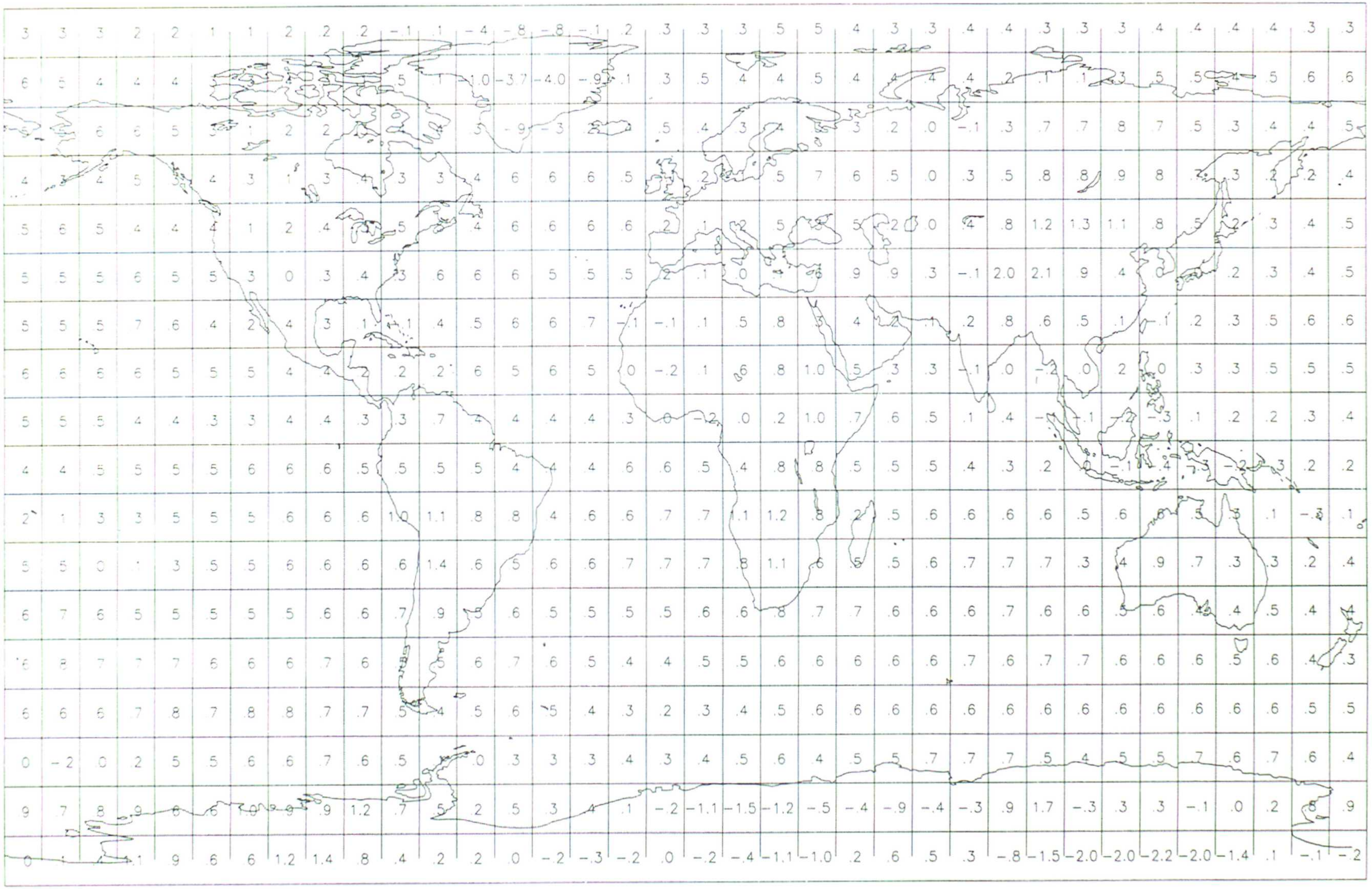
ATOVS : SD O-B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C)
MAY 1999 : HIRS4 channel (400 hPa)
NOAA-15, USING ALL OBSERVATIONS

FIGURE 33



ATOVS : MEAN O-B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C)
MAY 1999 : AMSUA-5 Channel (700 hPa)
NOAA-15, USING ALL OBSERVATIONS

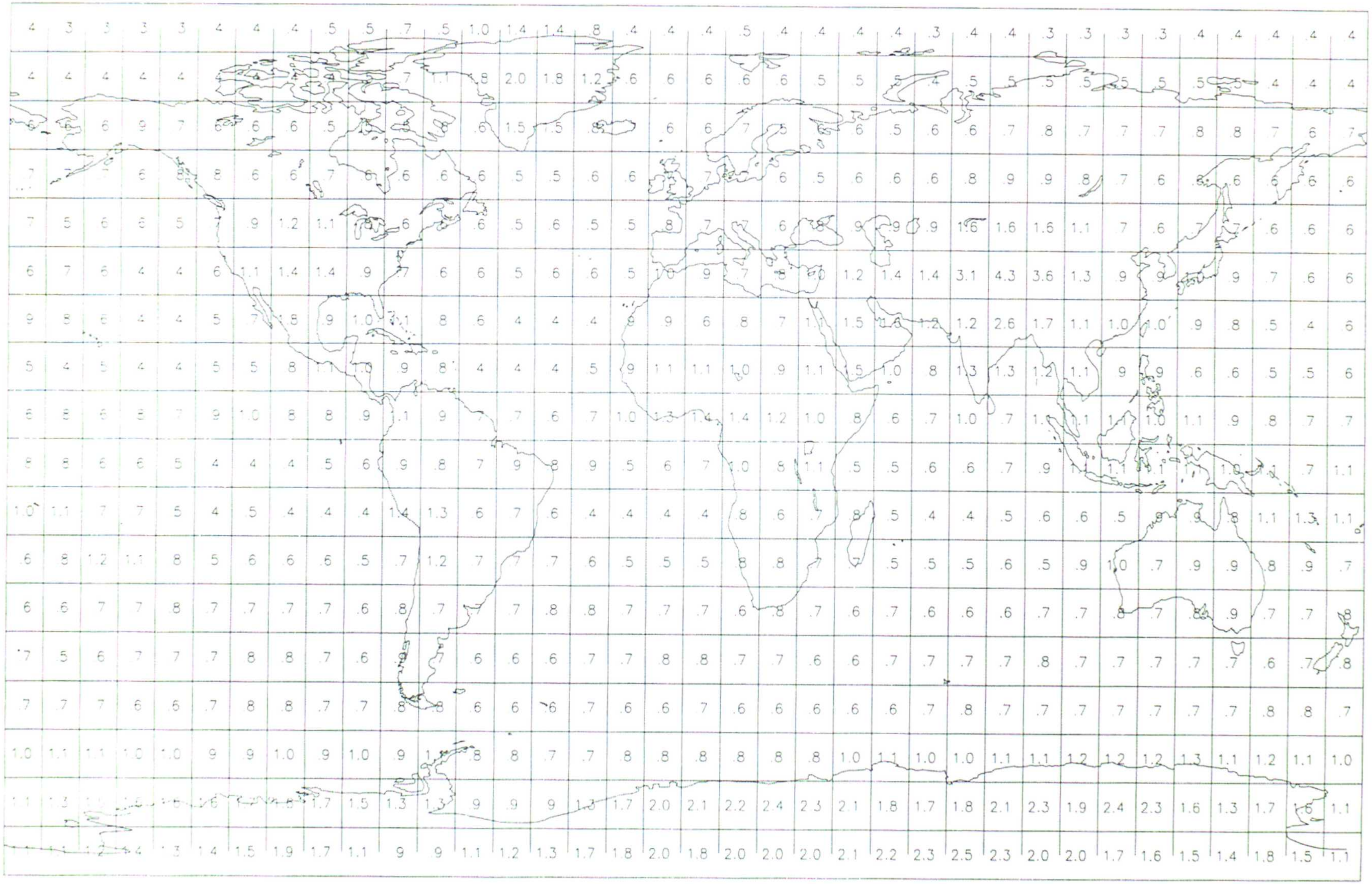
FIGURE 34



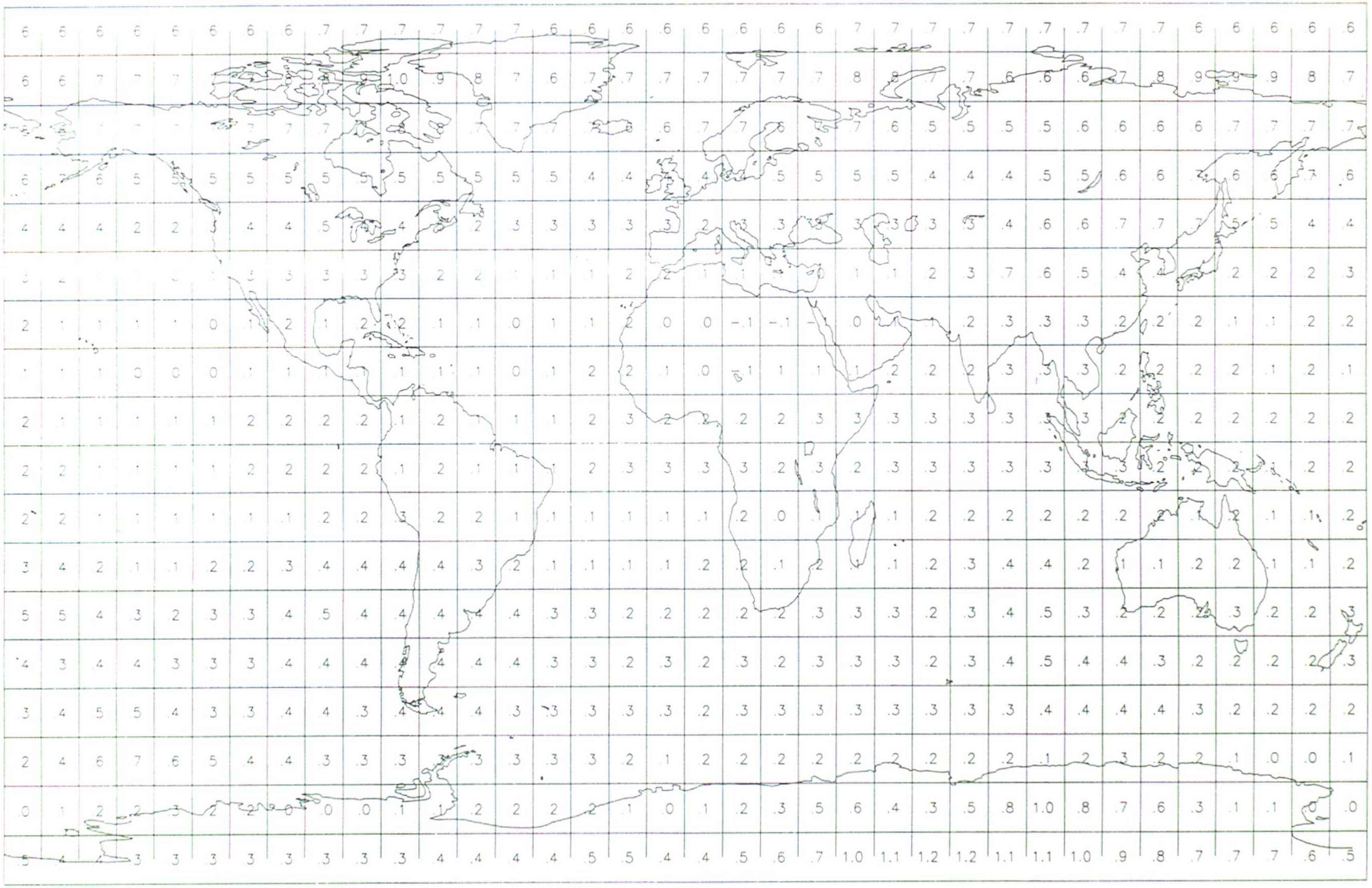
3 3 3 2 2 1 1 2 .2 .2 -.1 .1 -.4 -.8 -.8 -.1 .2 .3 .3 .3 .5 5 4 .3 .3 .4 .4 .3 .3 .3 .4 .4 .4 .4 .3 .3
6 5 4 4 4 5 3 4 .5 .1 -1.0 -3.7 -4.0 -.9 .1 .3 .5 4 4 .5 4 4 .4 .4 .2 .1 .1 .3 .5 .5 .4 .5 .6 .6
5 5 6 6 5 3 1 2 2 .4 .5 -.9 -.3 .2 .5 .4 .3 .4 .5 .3 .2 .0 -.1 .3 .7 .7 .8 .7 .5 .3 .4 .4 .5
4 3 4 5 3 4 3 1 3 .4 .3 3 .4 6 6 .6 .5 .2 .5 7 6 .5 .0 .3 .5 .8 .8 .9 8 .3 .2 .2 .4
.5 6 5 4 4 4 1 2 .4 .5 .4 6 .6 6 .6 .2 .1 .2 .5 5 .2 .0 .4 .8 1.2 1.3 1.1 .8 .5 .2 .3 .4 .5
5 .5 .5 6 5 5 3 0 .3 .4 .3 .6 6 6 5 .5 .5 .2 .1 .0 .6 .9 .9 .3 -.1 2.0 2.1 9 .4 .0 .2 .3 .4 .5
5 5 .5 7 .6 .4 2 4 .3 .1 .1 .4 .5 6 6 .7 -.1 -.1 .1 .5 .8 .3 4 .2 .1 .2 .8 .6 .5 .1 -.1 .2 .3 .5 .6 .6
6 6 6 6 5 5 5 4 .4 .2 .2 .2 6 5 6 5 .0 -.2 .1 .6 .8 1.0 .5 .3 .3 -.1 .0 -.2 .0 .2 .0 .3 .3 .5 .5 .5
5 5 .5 4 .4 .3 3 4 .4 .3 .3 .7 .4 4 .4 .4 .3 .0 -.2 .0 .2 1.0 .7 .6 .5 .1 .4 -.1 -.1 -.2 -.3 .1 .2 .2 .3 .4
4 4 .5 5 5 .5 6 6 .6 .5 .5 .5 5 4 .4 .4 6 .6 .5 .4 .8 .8 .5 .5 .5 .4 .3 .2 .0 -.1 .4 .3 -.2 .3 .2 .2
2 1 3 3 5 5 5 .6 6 .6 1.0 1.1 .8 .8 4 .6 .6 .7 .7 1.1 1.2 .8 .2 .5 .6 .6 .6 .6 .5 .6 .6 .5 .3 .1 -.3 .1
5 5 0 .1 3 .5 .5 6 .6 .6 .6 1.4 .6 5 .6 .6 .7 .7 .7 .8 1.1 .6 .5 .5 .6 .7 .7 .7 .3 .4 .9 .7 .3 .3 .2 .4
6 7 .6 5 5 .5 5 5 .6 .6 .7 .9 5 .6 .5 .5 .5 .5 .6 .6 .8 .7 .7 .6 .6 .6 .7 .6 .6 .5 .6 .4 .4 .5 .4 .4
6 8 7 7 7 6 6 6 .7 6 .5 6 .7 6 .5 .4 .4 .5 .5 .6 .6 6 .6 .6 .7 .6 .7 .7 .6 .6 .6 .5 .6 .4 .3
6 6 6 .7 .8 7 .8 .8 .7 .7 .5 .4 .5 .6 5 .4 .3 .2 .3 .4 .5 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .5 .5
0 -2 .0 .2 5 .5 .6 .6 .7 .6 .5 .0 .3 3 .3 .4 .3 .4 .5 .6 .4 .5 .5 .7 .7 .7 .5 .4 .5 .5 .7 .6 .7 .6 .4
9 .7 .8 .9 .6 .6 1.0 .9 .9 1.2 .7 .5 .2 .5 .3 .4 .1 -.2 -1.1 -1.5 -1.2 -.5 -.4 -.9 -.4 -.3 .9 1.7 -.3 .3 .3 -.1 .0 .2 .8 .9
0 .1 .9 .6 .6 1.2 1.4 .8 .4 .2 .2 .0 -.2 -.3 -.2 .0 -.2 -.4 -1.1 -1.0 .2 .6 .5 .3 -.8 -1.5 -2.0 -2.0 -2.2 -2.0 -1.4 .1 -.1 -.2

ATOVS : SD O-B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C)
MAY 1999 : AMSUA-5 channel (700 hPa)
NOAA-15 : USING ALL OBSERVATIONS

FIGURE 35

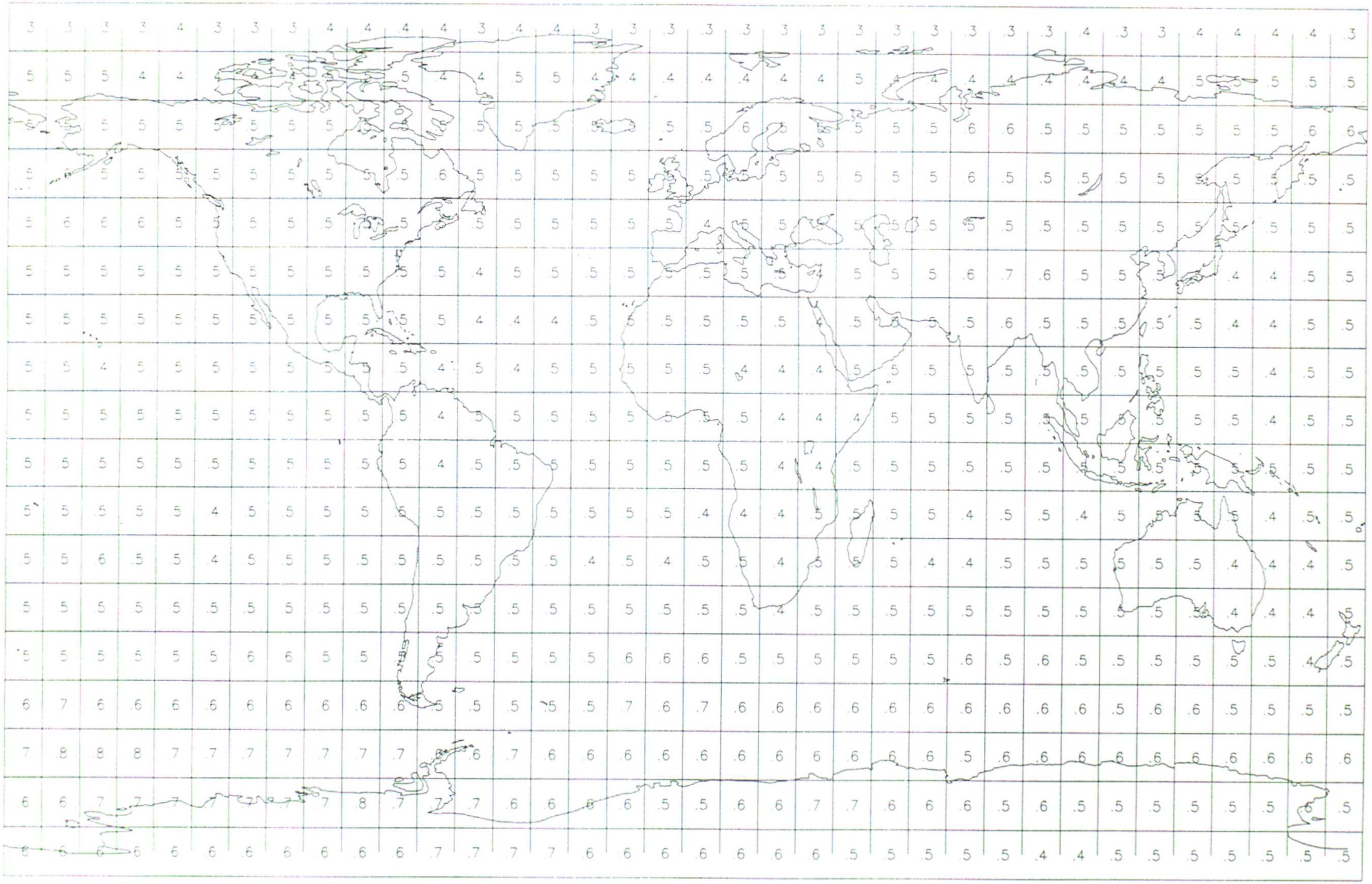

4 3 3 3 3 4 4 .4 .5 .5 .7 .5 1.0 1.4 1.4 .8 .4 .4 .4 .5 .4 .4 .4 .4 .3 .4 .4 .3 .3 3 .3 .4 .4 .4 .4 4
4 4 4 4 4 4 4 4 4 [illegible] .7 1.1 .8 2.0 1.8 1.2 .6 .6 .6 .6 .6 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 4
.6 .6 6 9 7 .6 .6 .6 .5 [illegible] [illegible] .8 .6 1.5 1.5 .8 .6 6 .7 .5 .6 .6 .5 .6 .6 .7 .8 .7 7 .7 .8 .8 7 6 7
.7 7 7 6 8 8 .6 6 .7 .6 .6 .6 .6 .5 .5 .6 .6 .7 .6 .5 .6 .6 .6 .8 .9 .9 .8 .7 .6 .8 .6 6 .6 .6
7 5 6 6 5 7 .9 1.2 1.1 .8 .6 .6 .5 .6 .5 .5 .8 .7 .7 .6 .8 .9 .9 .9 1.6 1.6 1.6 1.1 .7 .6 .7 .7 .6 .6 6
6 7 6 4 4 6 1.1 1.4 1.4 .9 .7 6 6 .5 .6 .6 .5 1.0 .9 .7 .8 1.0 1.2 1.4 1.4 3.1 4.3 3.6 1.3 .9 .9 1.0 .9 .7 .6 6
9 8 6 4 4 5 .7 1.8 .9 1.0 1.1 .8 .6 4 4 .4 .9 .9 6 .8 .7 1.1 1.5 1.6 1.2 1.2 2.6 1.7 1.1 1.0 1.0 .9 .8 .5 4 .6
5 4 5 4 4 5 5 .8 1.1 1.0 .9 .8 4 4 4 .5 .9 1.1 1.1 1.0 .9 1.1 1.5 1.0 .8 1.3 1.3 1.2 1.1 .9 .9 .6 .6 .5 .5 6
6 8 6 8 7 9 1.0 8 8 .9 1.1 9 .7 .7 6 .7 1.0 1.3 1.4 1.4 1.2 1.0 .8 .6 .7 1.0 .7 1.1 1.1 1.1 1.0 1.1 .9 .8 .7 .7
8 8 6 6 5 4 4 .4 .5 .6 .9 .8 7 9 .8 .9 .5 6 7 1.0 .8 1.1 .5 .5 .6 .6 .7 .9 1.1 1.1 1.1 1.1 1.0 1.1 .7 1.1
1.0 1.1 .7 .7 5 4 .5 .4 .4 .4 1.4 1.3 .6 .7 .6 .4 .4 .4 .4 .8 .6 .7 .8 .5 .4 .4 .5 .6 .6 .5 .9 .9 .8 1.1 1.3 1.1
.6 .8 1.2 1.1 .8 5 .6 .6 .6 .5 .7 1.2 .7 .7 .7 .6 .5 .5 .5 .8 .8 .7 .7 .5 .5 .5 .6 .5 .9 1.0 .7 .9 .9 .8 .9 .7
6 .6 7 .7 .8 .7 .7 .7 .7 .6 .8 .7 .7 .7 .8 .8 .7 .7 .7 .6 .8 .7 .6 .7 .6 .6 .6 .7 .7 .8 .7 .8 .9 .7 .7 .8
.7 .5 6 .7 7 .7 .8 .8 .7 .6 .9 .7 .6 .6 .6 .7 .7 .8 .8 .7 .7 .6 .6 .7 .7 .7 .7 .8 .7 .7 .7 .7 .7 .6 .7 .8
.7 .7 7 .6 .6 .7 .8 .8 .7 .7 .8 .8 .6 6 .6 .7 .6 .6 .7 .6 .6 .6 .6 .6 .7 .8 .7 .7 .7 .7 .7 .7 .7 .8 8 .7
1.0 1.1 1.1 1.0 1.0 .9 .9 1.0 .9 1.0 .9 [illegible] .8 .8 .7 .7 .8 .8 .8 .8 .8 .8 1.0 1.1 1.0 1.0 1.1 1.1 1.2 1.2 1.2 1.3 1.1 1.2 1.1 1.0
1.1 1.3 [illegible] [illegible] 1.6 1.6 1.7 1.6 1.7 1.5 1.3 1.3 .9 .9 9 1.3 1.7 2.0 2.1 2.2 2.4 2.3 2.1 1.8 1.7 1.8 2.1 2.3 1.9 2.4 2.3 1.6 1.3 1.7 1.6 1.1
1.1 1.1 1.2 1.4 1.3 1.4 1.5 1.9 1.7 1.1 9 .9 1.1 1.2 1.3 1.7 1.8 2.0 1.8 2.0 2.0 2.0 2.1 2.2 2.3 2.5 2.3 2.0 2.0 1.7 1.6 1.5 1.4 1.8 1.5 1.1

ATOVS : MEAN O-B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C) FIGURE 36
MAY 1999 : AMSUA-7 Channel (300 hPa)
NOAA-15, USING ALL OBSERVATIONS



ATOVS : SD O-B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C)
MAY 1999 : AMSUA-7 channel (300 hPa)
NOAA-15, USING ALL OBSERVATIONS

FIGURE 37

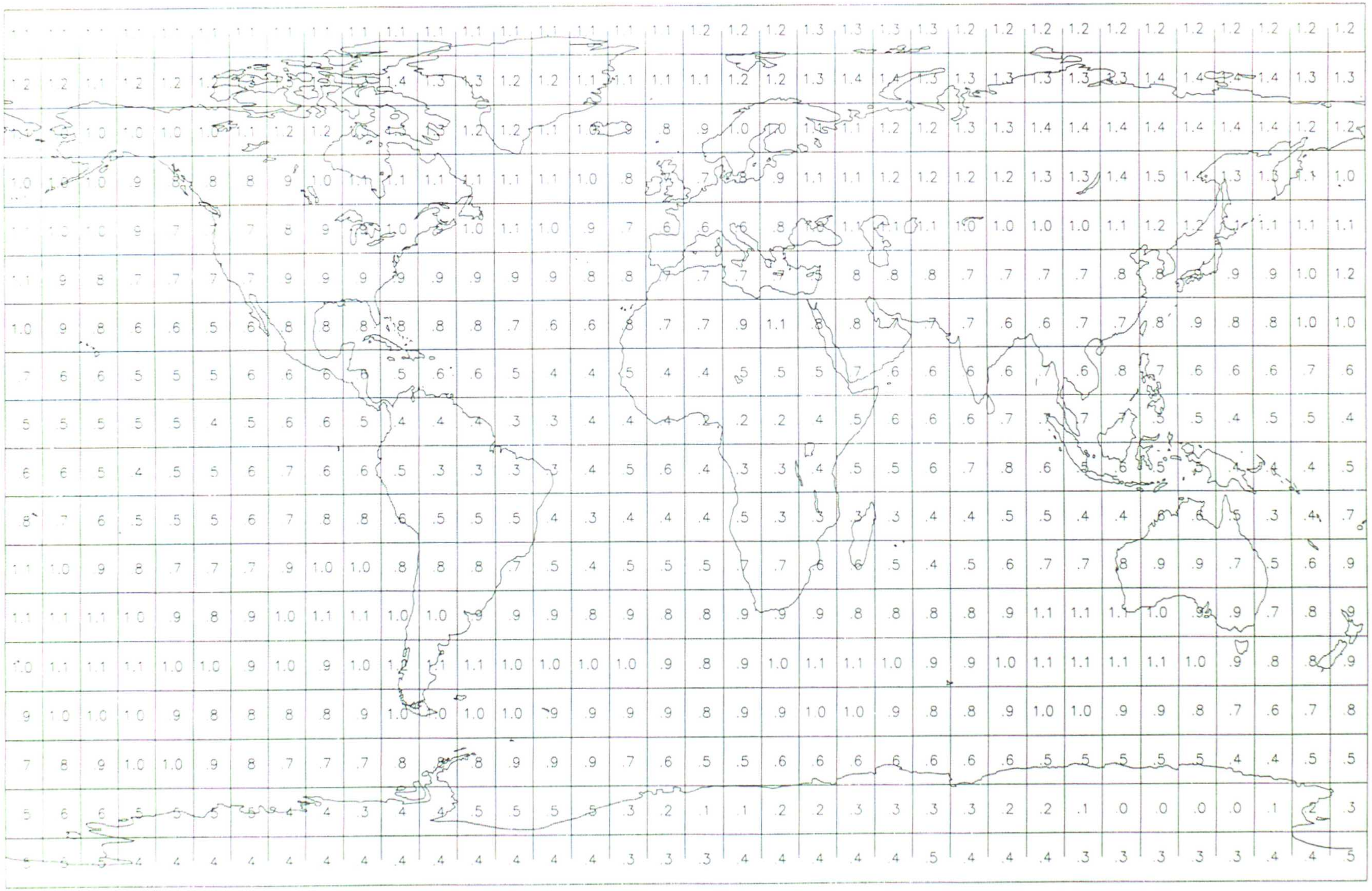


ATOVS : MEAN O-B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C)

MAY 1999 : AMSUA-9 Channel (100 hPa)

NOAA-15 USING ALL OBSERVATIONS

FIGURE 38



ATOVS : SD O--B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C)
MAY 1999 : AMSUA-9 channel (100 hPa)
NOAA-15, USING ALL OBSERVATIONS

FIGURE 39

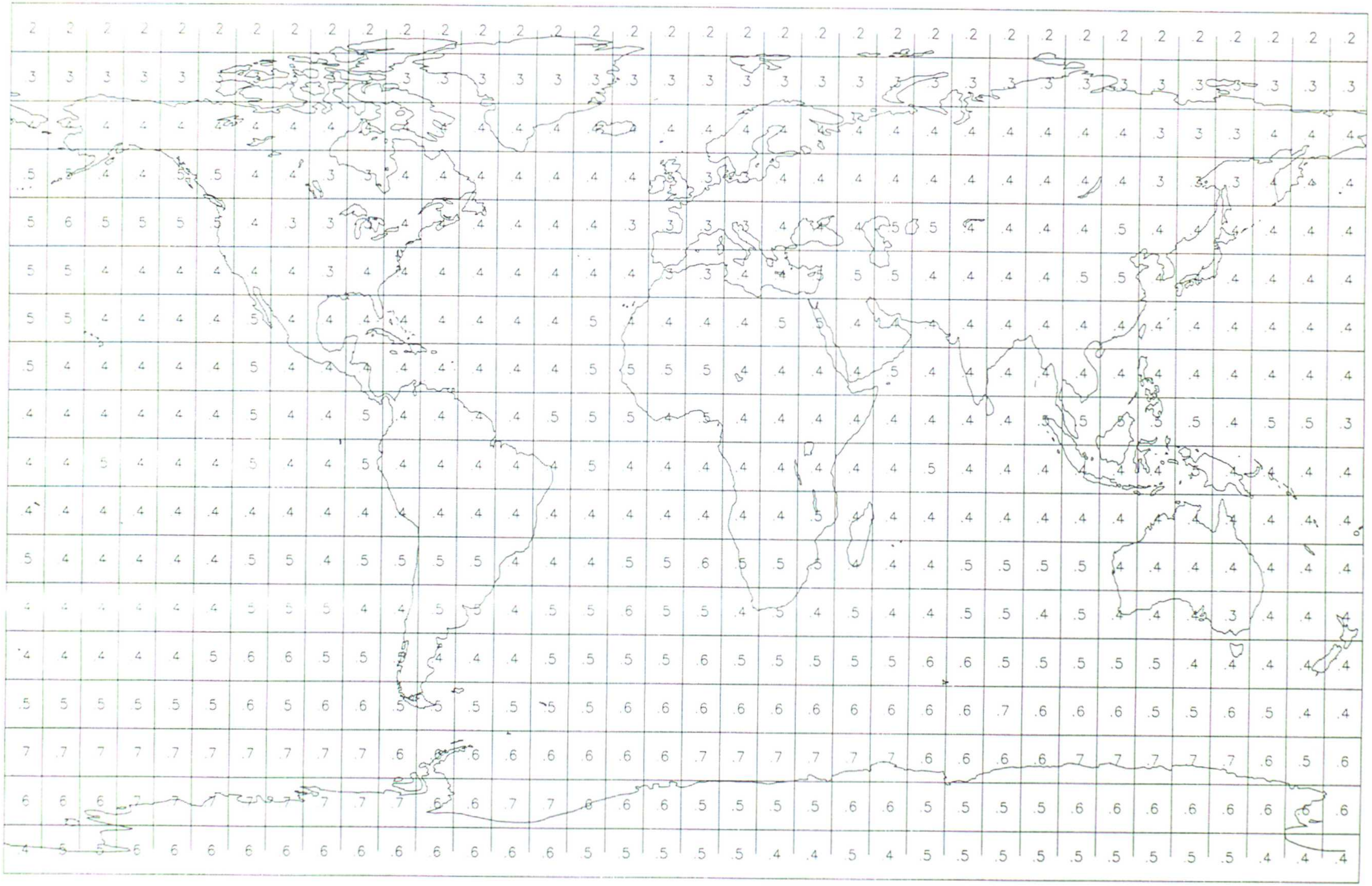


TABLE 8

MONTHLY MONITORING OF MARINE SURFACE OBSERVATIONS (COSNA)
DATA TYPE:- DRIFTER
MONITORING CENTRE: BRACKNELL
MONTH: May 1999

Monitoring procedures		
Period		:One calendar month.
Data monitored		:Reports from each unique identifier for drifting buoy.
Area monitored		:10°N - 80°N, 85°W - 0°W
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:All hours combined.
Elements monitored		:Mean sea-level pressure (hPa) :Wind speed (m s^{-1}) :Wind direction (degrees)
Parameters monitored		
	:NOBS	:Number of observations received excluding duplicates.
	:NGE	:Number of observations with gross errors.
	:PGE	:Percentage of observations with gross errors.
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors. **N.B. A positive bias indicates the observation is veered to the background**
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors
GROSS ERROR LIMITS	:15 hPa (pressure) :25 m s^{-1} (Vector Wind)	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

MEAN SEA LEVEL PRESSURE

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
13508	14.6	-28.9	ALL	P	SUR	319	0	0	0.7	0.3	0.8
13510	23.8	-33.6	ALL	P	SUR	859	0	0	0.7	0.1	0.7
13511	17.1	-34.1	ALL	P	SUR	363	0	0	0.7	-0.6	1.0
39905	17.8	-83.5	ALL	P	SUR	41	0	0	0.9	0.2	1.0
41501	11.1	-44.7	ALL	P	SUR	728	0	0	0.8	0.3	0.9
41502	23.1	-39.8	ALL	P	SUR	206	0	0	0.9	0.1	0.9
41503	25.8	-66.9	ALL	P	SUR	19	0	0	0.6	-0.5	0.8
41504	25.1	-75.8	ALL	P	SUR	274	0	0	0.8	0.1	0.8
41505	30.8	-58.5	ALL	P	SUR	291	0	0	0.7	-0.2	0.8
41521	28.3	-51.3	ALL	P	SUR	287	0	0	0.8	-0.2	0.8
41522	22.9	-36.7	ALL	P	SUR	846	0	0	0.7	-0.1	0.7
41523	17.1	-46.1	ALL	P	SUR	12	1	8	1.0	0.5	1.1
41528	29.4	-71.6	ALL	P	SUR	281	0	0	0.7	0.0	0.7
41598	26.6	-46.9	ALL	P	SUR	211	0	0	0.8	-0.2	0.8
41599	28.4	-36.7	ALL	P	SUR	622	4	1	0.7	-0.4	0.8
41625	25.8	-70.2	ALL	P	SUR	260	0	0	0.8	0.0	0.8
41629	23.5	-72.2	ALL	P	SUR	256	0	0	0.8	0.1	0.8
41636	22.7	-58.9	ALL	P	SUR	642	32	5	1.0	0.3	1.1
41637	25.5	-39.3	ALL	P	SUR	318	2	1	0.8	0.2	0.9
41638	25.1	-57.8	ALL	P	SUR	641	0	0	1.0	-0.1	1.0
44513	38.7	-35.7	ALL	P	SUR	308	0	0	0.7	-1.3	1.5
44514	47.8	-34.3	ALL	P	SUR	370	0	0	0.9	-1.3	1.6
44515	40.8	-38.3	ALL	P	SUR	318	0	0	1.0	-0.8	1.3
44517	40.9	-37.6	ALL	P	SUR	315	0	0	1.0	-1.1	1.5
44546	42.8	-40.0	ALL	P	SUR	1828	0	0	1.0	-0.2	1.0
44607	52.2	-47.3	ALL	P	SUR	654	2	0	1.2	-0.3	1.2
44608	47.3	-36.5	ALL	P	SUR	1721	1	0	1.1	-0.4	1.2
44610	54.3	-39.3	ALL	P	SUR	1762	4	0	1.2	-0.3	1.3
44613	39.6	-18.5	ALL	P	SUR	1043	10	1	1.3	-0.1	1.3
44616	57.3	-26.0	ALL	P	SUR	1024	0	0	1.1	-0.2	1.1
44621	47.9	-41.3	ALL	P	SUR	468	8	2	0.9	-0.7	1.2
44624	54.8	-27.9	ALL	P	SUR	972	0	0	1.1	-0.6	1.2
44728	52.2	-30.4	ALL	P	SUR	531	3	1	1.2	-0.8	1.4
44742	44.8	-4.5	ALL	P	SUR	1150	4	0	1.3	-0.2	1.3
44762	40.5	-38.0	ALL	P	SUR	245	1	0	1.0	-0.6	1.2
44764	50.4	-9.2	ALL	P	SUR	1223	4	0	0.9	-0.2	0.9
44765	36.6	-50.6	ALL	P	SUR	408	2	0	1.3	-0.5	1.4
44766	54.8	-47.6	ALL	P	SUR	714	5	1	1.5	-0.7	1.6
44773	55.5	-37.9	ALL	P	SUR	451	1	0	1.1	-0.8	1.4
44777	61.4	-29.5	ALL	P	SUR	527	1	0	1.4	-0.4	1.4
44778	49.1	-11.9	ALL	P	SUR	1349	17	1	1.3	-0.4	1.4
44805	42.9	-68.9	ALL	P	SUR	1	0	0	0.0	1.0	1.0
44901	53.1	-9.0	ALL	P	SUR	64	0	0	0.9	0.2	0.9
45835	43.8	-76.9	ALL	P	SUR	1	0	0	0.0	2.2	2.2
46510	44.7	-63.6	ALL	P	SUR	23	0	0	0.8	-5.9	5.9
62503	46.2	-19.9	ALL	P	SUR	92	0	0	4.0	4.5	6.0
62504	47.1	-15.0	ALL	P	SUR	33	0	0	2.4	5.0	5.5
62505	48.1	-18.1	ALL	P	SUR	733	1	0	1.3	-0.7	1.5
62506	44.6	-18.4	ALL	P	SUR	584	0	0	1.3	0.0	1.3
62512	44.7	-18.9	ALL	P	SUR	5	0	0	0.7	0.3	0.8
62519	32.7	-19.5	ALL	P	SUR	447	3	1	0.8	0.0	0.8
62520	40.7	-18.9	ALL	P	SUR	1029	4	0	1.2	-0.5	1.3
62554	41.5	-12.8	ALL	P	SUR	1038	10	1	1.2	-0.1	1.2
62675	39.7	-36.4	ALL	P	SUR	314	0	0	0.7	-0.6	1.0
62703	49.9	-2.9	ALL	P	SUR	1	0	0	0.0	0.1	0.1
62707	50.1	-6.1	ALL	P	SUR	1	0	0	0.0	0.1	0.1
62708	53.5	-19.5	ALL	P	SUR	1	0	0	0.0	0.7	0.7
64516	64.5	-29.9	ALL	P	SUR	2385	3	0	1.3	-0.3	1.4
64517	63.4	-37.1	ALL	P	SUR	2015	4	0	1.3	0.0	1.3
64518	62.6	-37.9	ALL	P	SUR	2163	0	0	1.2	-0.5	1.3

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE											
64519	61.4	-30.0	ALL	P	SUR	1228	3	0	1.6	-0.3	1.6
64529	60.2	-12.2	ALL	P	SUR	1160	28	2	1.4	-0.9	1.7
64691	65.7	-24.7	ALL	P	SUR	486	55	11	2.9	-0.2	2.9
64695	64.3	-24.2	ALL	P	SUR	1041	1	0	1.2	-0.4	1.3
64696	64.0	-22.9	ALL	P	SUR	668	1	0	1.2	-0.9	1.5
64697	63.8	-22.9	ALL	P	SUR	633	1	0	1.2	-0.7	1.4
65592	61.9	-20.6	ALL	P	SUR	339	84	25	8.0	-2.8	8.4
65593	58.7	-31.4	ALL	P	SUR	1120	24	2	1.4	-0.8	1.6
65594	59.1	-38.8	ALL	P	SUR	1150	21	2	1.3	-0.5	1.4
65595	56.8	-43.0	ALL	P	SUR	980	47	5	1.4	-0.9	1.6
65599	59.9	-37.8	ALL	P	SUR	1930	21	1	1.4	-0.3	1.5
WIND SPEED											
39905	17.8	-83.5	ALL	SPEED	SUR	36	0	0	2.6	1.0	2.8
41504	25.1	-75.8	ALL	SPEED	SUR	240	0	0	1.7	-0.2	1.7
41521	28.3	-51.3	ALL	SPEED	SUR	264	0	0	1.4	-0.5	1.4
41625	25.8	-70.2	ALL	SPEED	SUR	237	0	0	1.7	-0.5	1.8
41629	23.5	-72.2	ALL	SPEED	SUR	203	0	0	1.9	-1.4	2.4
41636	22.7	-58.9	ALL	SPEED	SUR	336	0	0	1.6	-0.8	1.7
41637	25.5	-39.3	ALL	SPEED	SUR	199	0	0	1.4	-1.4	1.9
41638	25.1	-57.8	ALL	SPEED	SUR	372	0	0	1.9	-0.7	2.0
44607	52.2	-47.3	ALL	SPEED	SUR	646	0	0	2.3	1.8	2.9
44742	44.8	-4.5	ALL	SPEED	SUR	1	0	0	0.0	23.2	23.2
44762	40.5	-38.0	ALL	SPEED	SUR	227	0	0	1.8	-0.1	1.8
44773	55.5	-37.9	ALL	SPEED	SUR	413	0	0	1.9	-0.4	1.9
44777	61.4	-29.5	ALL	SPEED	SUR	467	0	0	2.6	-2.6	3.7
44805	42.9	-68.9	ALL	SPEED	SUR	1	0	0	0.0	-1.0	1.0
62504	47.1	-15.0	ALL	SPEED	SUR	490	0	0	1.9	-0.5	2.0
62505	48.1	-18.1	ALL	SPEED	SUR	700	0	0	1.8	0.4	1.9
62506	44.6	-18.4	ALL	SPEED	SUR	570	0	0	1.9	0.8	2.0
62509	48.3	-20.2	ALL	SPEED	SUR	1	0	0	0.0	1.4	1.4
62703	49.9	-2.9	ALL	SPEED	SUR	1	0	0	0.0	3.4	3.4
62707	50.1	-6.1	ALL	SPEED	SUR	1	0	0	0.0	0.1	0.1
62708	53.5	-19.5	ALL	SPEED	SUR	1	0	0	0.0	-2.5	2.5
65599	59.9	-37.8	ALL	SPEED	SUR	1419	0	0	2.0	-0.4	2.1
WIND DIRECTION											
39905	17.8	-83.5	ALL	DIRN.	SUR	17	0	0	24.6	2.1	24.7
41504	25.1	-75.8	ALL	DIRN.	SUR	50	0	0	13.1	-4.5	13.9
41521	28.3	-51.3	ALL	DIRN.	SUR	128	0	0	15.5	-12.1	19.7
41625	25.8	-70.2	ALL	DIRN.	SUR	41	0	0	25.4	2.4	25.5
41629	23.5	-72.2	ALL	DIRN.	SUR	43	0	0	20.4	13.0	24.1
41636	22.7	-58.9	ALL	DIRN.	SUR	2	0	0	42.1	-24.6	48.7
41637	25.5	-39.3	ALL	DIRN.	SUR	18	0	0	16.7	-14.4	22.1
41638	25.1	-57.8	ALL	DIRN.	SUR	42	0	0	29.2	8.0	30.3
44607	52.2	-47.3	ALL	DIRN.	SUR	449	0	0	17.6	1.4	17.6
44762	40.5	-38.0	ALL	DIRN.	SUR	120	0	0	19.8	-17.1	26.2
44773	55.5	-37.9	ALL	DIRN.	SUR	317	0	0	14.4	-3.2	14.8
44777	61.4	-29.5	ALL	DIRN.	SUR	165	0	0	13.3	1.0	13.3
62504	47.1	-15.0	ALL	DIRN.	SUR	259	0	0	19.7	2.3	19.9
62505	48.1	-18.1	ALL	DIRN.	SUR	473	0	0	20.3	-21.6	29.7
62506	44.6	-18.4	ALL	DIRN.	SUR	316	0	0	22.4	4.9	22.9
62509	48.3	-20.2	ALL	DIRN.	SUR	1	0	0	0.0	-8.1	8.1
62708	53.5	-19.5	ALL	DIRN.	SUR	1	0	0	0.0	28.0	28.0
65599	59.9	-37.8	ALL	DIRN.	SUR	1144	0	0	16.5	-0.4	16.5

TABLE 9

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: May 1999

Monitoring procedures:

Period		:One calendar month.
Data monitored		:Statistics for each airline carrier.
Area monitored		:40°N - 70°N, 60°W - 0°W.
Standard of comparison		:Background field from UKMO global model.
Observation times		:All hours combined.
Level(s) monitored		:300.0 - 150.0 hPa
Elements monitored		:TEMP in °C ; WIND in m s^{-1}
Parameters monitored	:N REP.	:Number of observations received excluding duplicates.
	:PG	:Percentage of observations with gross errors.
	:PR	:Percentage of observations rejected by quality control including rejections from the duplicate check.
	:PC	:Percentage of observations with calm winds.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors in Temperature & vector wind.
GROSS ERROR LIMITS	:10.0 °C ; 60 m s^{-1} Vector Wind	
SELECTION CRITERIA	:N REP ≥ 20	

NB: US ACARs and ADS data are shown at the bottom of the table as US ACAR and ADS respectively.

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAL	3059	0	14	1.8	-0.1	3038	0	14	0	8.3	1.0
ACA	1419	1	7	1.7	-0.1	1432	0	7	0	6.8	1.0
AEA	240	0	6	2.0	0.0	225	0	8	0	8.0	1.3
AEL	257	1	19	2.5	0.7	262	0	18	0	8.9	1.1
AEY	25	0	8	1.2	0.8	25	0	12	0	12.4	0.4
AFL	398	1	4	1.8	0.4	404	0	5	0	7.6	1.2
AFR	1194	1	12	2.0	0.1	1220	0	12	0	7.7	0.9
AIH	68	0	9	1.8	0.6	69	0	9	0	7.6	1.2
AJM	51	2	4	1.8	-1.2	51	0	0	0	6.0	1.9
AMM	77	0	8	1.7	0.1	79	0	11	0	8.9	-0.3
AMX	259	1	6	1.9	0.1	259	0	6	0	8.7	1.3
ANZ	256	0	12	1.8	-0.9	257	0	13	0	6.1	0.2
AOM	356	0	2	1.8	0.5	361	1	4	0	8.7	0.9
AUA	29	3	7	1.6	-0.6	29	0	3	0	6.3	1.5
AVA	158	0	4	1.8	-0.4	164	1	6	0	9.1	1.2
AZA	383	1	13	2.3	0.5	383	0	14	0	8.8	1.1
BAL	269	0	20	1.8	-0.7	276	0	20	0	7.1	0.6
BAW	1725	0	12	1.9	-0.3	1743	0	13	0	7.4	1.0
BLX	45	2	7	1.3	-0.3	44	0	7	0	5.8	0.7
BWA	111	0	6	2.3	1.4	111	0	8	0	8.1	0.5
CDN	677	1	9	1.8	0.2	678	0	9	0	7.7	1.1
CFC	23	0	9	2.5	0.3	23	0	9	0	6.5	1.8
CFG	571	1	5	2.0	-0.5	573	0	6	0	7.9	0.6
CKS	60	2	10	2.0	-0.1	61	0	15	0	10.4	1.4
CKT	132	1	11	1.6	0.7	129	1	11	0	6.2	0.7
CLX	410	0	7	1.7	-0.3	410	1	9	0	7.7	0.5
CMM	422	0	5	1.5	0.1	424	0	5	0	5.9	0.8
COA	776	0	12	1.8	-0.2	772	1	16	0	12.6	2.5
CRL	185	1	3	1.7	0.4	190	0	4	0	6.8	1.0
CSA	26	0	4	2.5	-0.3	26	0	4	0	8.7	0.0
CTB	138	1	2	1.9	-0.3	140	0	1	0	6.8	0.9
CUB	289	0	7	1.8	0.4	286	0	9	0	8.1	0.7
DAL	1757	0	21	2.0	-0.6	1785	0	21	0	9.1	0.7
DBY	432	0	3	1.7	-0.8	438	0	4	0	7.5	0.8
DLH	2654	0	11	1.9	-0.1	2648	0	12	0	7.3	0.8
EEZ	33	0	21	1.2	-0.5	33	0	24	0	11.1	-1.2
EIA	57	2	14	1.6	0.4	57	0	37	0	16.9	1.5
ELY	145	1	6	1.4	-0.2	155	0	5	0	5.6	0.7
EWW	76	1	17	2.2	-0.4	77	0	14	0	7.9	2.3
FDX	576	1	15	1.8	0.3	584	0	15	0	8.5	1.0
FIN	372	0	11	1.9	0.2	364	0	13	0	8.9	1.1
GAF	53	0	4	1.9	-1.2	53	0	6	0	6.4	1.4
GRL	40	0	0	1.3	0.0	37	0	0	0	5.3	0.4
GTI	56	4	32	2.6	0.7	56	0	32	0	9.0	1.4
HLF	59	0	5	2.1	-0.8	60	0	10	0	8.4	1.1
IBE	1628	1	23	1.9	0.3	1629	0	24	0	8.8	1.3
ICE	1141	0	6	1.7	0.1	1124	0	7	0	7.9	1.3
IWD	106	0	8	1.7	-0.5	104	1	7	0	8.1	2.0
JKK	160	1	15	1.8	0.0	141	0	17	0	10.3	1.7
KLM	2166	1	12	1.8	0.1	2184	0	12	0	7.8	1.1
KSV	127	2	31	2.3	-0.4	132	0	32	0	8.8	0.7
LDA	77	0	12	1.9	-0.1	78	0	13	0	8.4	-0.4
LDI	281	1	15	1.8	-0.6	279	0	15	0	7.6	0.8
LGL	37	5	8	1.9	-1.3	37	0	3	0	4.8	-0.3
LIB	160	1	4	2.0	1.0	162	0	5	0	8.9	0.9
LOT	329	0	11	2.0	-1.0	326	0	12	0	7.9	0.7
LTU	476	0	10	1.7	-0.5	476	0	12	0	7.4	1.0
MAS	49	2	18	1.7	0.4	50	0	20	0	10.8	0.4
MON	173	1	8	1.7	-0.1	176	1	9	0	8.1	1.2

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
MPD	101	0	3	2.3	0.9	100	1	4	0	7.2	1.3
MPH	650	1	6	2.0	-0.6	655	0	6	0	7.6	0.7
NCA	32	3	3	1.6	-0.4	31	0	0	0	5.6	1.8
NWA	3386	1	6	2.0	0.7	3198	0	4	0	7.5	0.9
PAC	119	1	9	2.5	0.3	121	0	10	0	8.1	1.2
RAM	78	0	5	1.8	-0.3	77	0	5	0	7.1	1.5
RCH	221	0	8	2.1	0.5	218	0	100	0	10.9	2.9
RJA	27	0	4	2.1	0.6	27	0	7	0	12.8	0.0
ROY	137	1	10	1.7	-0.5	137	0	11	0	9.9	0.8
RRR	40	0	28	1.7	-0.3	44	0	30	0	9.4	0.8
SAB	53	0	6	1.2	-0.1	55	0	5	0	5.2	0.4
SAS	1598	0	1	1.6	-0.3	1586	0	2	0	6.4	0.6
SIA	166	0	7	1.8	-0.8	172	0	9	0	6.4	0.8
SLR	103	0	17	1.5	-0.7	103	0	17	0	7.1	1.6
SVA	94	0	5	1.7	-0.4	95	0	6	0	7.3	0.5
SWR	108	1	8	1.8	0.0	108	0	9	0	7.8	0.5
TAP	467	1	10	1.7	-0.3	466	0	11	0	8.3	1.4
TOW	71	0	6	1.8	0.2	76	0	13	0	11.2	1.0
TSC	93	0	13	1.9	-0.1	99	0	11	0	8.3	1.7
TWA	1096	0	12	1.9	0.0	1054	0	12	0	8.6	1.1
UAL	2197	0	9	1.9	0.0	2215	0	9	0	6.8	0.7
UPS	746	1	29	1.9	0.3	754	0	28	0	7.8	0.6
USA	284	0	6	1.7	-0.3	234	0	7	0	7.1	1.2
VIR	394	1	8	1.7	-0.4	391	0	9	0	7.9	0.3
VKG	46	0	0	1.5	0.7	46	0	7	0	11.8	-0.2
WOA	33	15	30	3.8	1.7	33	0	9	0	12.0	0.3
BA	9063	0	1	1.4	0.1	9061	0	1	0	5.8	0.9
KL	3765	0	0	1.8	1.0	3762	0	0	0	5.8	0.6
ADS	450	1	6	2.4	0.8	459	0	6	0	7.8	-0.1
US ACARS	14802	0	3	1.5	0.3	14800	0	2	0	6.5	0.8

TABLE 10

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: May 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DBBH	00	Z	100	2	0	18.5	18.6	-1.5
DBBH	12	Z	100	17	0	15.0	15.3	2.7
DBLK	00	Z	100	1	0	0.0	30.0	30.0
DBLK	12	Z	100	6	0	17.5	31.9	26.7
ELML7	00	Z	100	15	0	13.9	24.9	20.7
ELML7	12	Z	100	15	0	61.2	62.8	14.1
ELMN7	00	Z	100	1	0	0.0	26.0	26.0
FNOR	00	Z	100	17	0	9.6	25.9	24.0
FNOR	12	Z	100	16	0	8.1	18.2	16.3
FNOU	00	Z	100	12	0	8.8	25.5	23.9
FNOU	12	Z	100	11	1	10.4	16.7	13.0
FNPH	00	Z	100	12	0	7.5	10.6	7.4
FNPH	12	Z	100	13	0	26.0	26.3	3.8
FNRS	00	Z	100	12	0	13.3	20.1	15.1
FNRS	12	Z	100	12	0	42.0	42.2	-4.1
JBOA	00	Z	100	1	0	0.0	34.0	34.0
JDWX	00	Z	100	1	0	0.0	26.0	26.0
JGQH	00	Z	100	1	0	0.0	12.0	12.0
JIVB	00	Z	100	1	0	0.0	11.0	11.0
LDWR	00	Z	100	21	0	6.7	15.2	13.7
LDWR	12	Z	100	26	0	12.6	14.7	7.5
OVYA2	00	Z	100	3	0	6.5	22.9	-22.0
OVYA2	12	Z	100	3	0	0.9	1.2	-0.7
OXYH2	00	Z	100	1	0	0.0	9.0	9.0
SHIPAF	00	Z	100	5	0	15.6	22.0	15.6
SHIPAF	12	Z	100	1	0	0.0	77.0	77.0
UCKZ	00	Z	100	1	0	0.0	27.0	27.0
V2XM	00	Z	100	2	0	7.5	7.9	-2.5
V2XM	12	Z	100	2	0	1.0	12.0	-12.0
03953	00	Z	100	28	0	10.7	24.5	22.0
03953	12	Z	100	30	0	7.2	15.1	13.3
04018	00	Z	100	28	0	11.5	19.8	16.1
04018	12	Z	100	30	0	10.3	14.8	10.5
04220	00	Z	100	5	0	12.3	22.3	18.6
04220	12	Z	100	6	0	6.4	12.3	10.5
04270	00	Z	100	27	0	14.5	17.6	10.0
04270	12	Z	100	26	0	8.9	15.0	12.0
04339	00	Z	100	22	0	21.8	24.4	11.0
04339	12	Z	100	20	0	9.3	24.4	22.6
04360	00	Z	100	26	0	12.2	19.4	15.1
04360	12	Z	100	30	0	11.7	14.6	8.7
08001	00	Z	100	23	0	10.4	23.9	21.5
08001	12	Z	100	27	0	12.2	13.4	5.5
08508	00	Z	100	1	0	0.0	4.0	4.0
08508	12	Z	100	25	0	12.6	15.2	8.5
08522	00	Z	100	1	0	0.0	8.0	8.0
08522	12	Z	100	30	0	9.1	13.3	9.6
08594	00	Z	100	1	0	0.0	7.0	-7.0
08594	12	Z	100	20	0	22.6	34.3	25.8
60020	00	Z	100	1	0	0.0	22.0	22.0
60020	12	Z	100	3	0	12.4	21.8	18.0
71600	00	Z	100	27	0	15.2	15.6	3.7
71600	12	Z	100	30	0	14.3	14.9	-4.1
72201	00	Z	100	27	0	9.6	44.5	43.5
72201	12	Z	100	29	0	11.5	49.4	48.0
72402	00	Z	100	26	0	15.7	40.4	37.3
72402	12	Z	100	31	0	14.3	45.8	43.5
74494	00	Z	100	26	0	10.3	18.3	15.1
74494	12	Z	100	28	1	9.7	12.9	-8.5
78016	12	Z	100	29	0	8.4	24.7	23.2

TABLE 11

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: May 1999

Monitoring procedures:

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:500 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
/BBH	12	Z	500	1	0	0.0	14.0	14.0
DBBH	00	Z	500	3	0	1.7	7.5	7.3
DBBH	12	Z	500	17	0	8.9	11.0	6.5
DBLK	00	Z	500	1	0	0.0	15.0	15.0
DBLK	12	Z	500	6	0	10.6	10.6	1.0
ELML7	00	Z	500	17	1	8.5	12.2	8.7
ELML7	12	Z	500	15	1	9.6	14.1	10.3
ELMN7	00	Z	500	1	0	0.0	4.0	4.0
FNOR	00	Z	500	17	0	6.7	12.1	10.1
FNOR	12	Z	500	17	0	8.1	16.8	14.6
FNOU	00	Z	500	12	0	6.7	10.3	7.8
FNOU	12	Z	500	11	1	9.3	14.3	10.9
FNPH	00	Z	500	12	0	10.0	12.8	8.0
FNPH	12	Z	500	13	0	9.8	12.3	7.4
FNRS	00	Z	500	12	0	11.2	13.6	7.8
FNRS	12	Z	500	12	0	16.2	16.2	0.8
JBOA	00	Z	500	1	0	0.0	7.0	7.0
JDWX	00	Z	500	1	0	0.0	17.0	17.0
JGQH	00	Z	500	1	0	0.0	10.0	10.0
JIVB	00	Z	500	1	0	0.0	8.0	8.0
LDWR	00	Z	500	23	0	4.8	8.4	6.9
LDWR	12	Z	500	26	0	8.6	8.7	1.3
OVYA2	00	Z	500	3	0	10.7	21.2	-18.3
OVYA2	12	Z	500	3	0	3.3	6.0	-5.0
OXYH2	00	Z	500	1	0	0.0	1.0	-1.0
SHIPAF	00	Z	500	5	0	9.9	12.1	7.0
SHIPAF	12	Z	500	2	0	8.5	8.6	-1.5
UCKZ	00	Z	500	1	0	0.0	10.0	10.0
V2XM	00	Z	500	2	0	4.5	12.3	-11.5
V2XM	12	Z	500	2	0	6.0	16.2	-15.0
03953	00	Z	500	29	0	6.9	12.4	10.3
03953	12	Z	500	30	0	6.5	9.8	7.3
04018	00	Z	500	29	0	11.1	14.4	9.2
04018	12	Z	500	31	0	11.0	11.4	3.0
04220	00	Z	500	29	0	14.1	15.1	5.5
04220	12	Z	500	30	0	13.4	13.7	2.8
04270	00	Z	500	29	0	10.6	12.1	5.9
04270	12	Z	500	30	0	18.2	18.6	4.1
04339	00	Z	500	28	0	12.5	14.6	7.5
04339	12	Z	500	29	0	7.9	10.0	6.1
04360	00	Z	500	27	0	14.4	14.6	2.7
04360	12	Z	500	31	0	13.6	14.2	-3.9
08001	00	Z	500	28	0	10.1	14.3	10.1
08001	12	Z	500	31	0	9.9	9.9	0.1
08508	00	Z	500	1	0	0.0	10.0	10.0
08508	12	Z	500	28	0	7.5	8.6	4.3
08522	00	Z	500	1	0	0.0	2.0	-2.0
08522	12	Z	500	30	0	6.2	9.0	6.5
08594	00	Z	500	1	0	0.0	11.0	11.0
08594	12	Z	500	21	0	6.6	7.5	3.5
60020	00	Z	500	26	0	7.0	10.2	7.3
60020	12	Z	500	31	0	7.5	8.7	4.5
71600	00	Z	500	27	0	13.3	13.4	-2.0
71600	12	Z	500	30	0	9.3	11.1	6.0
72201	00	Z	500	28	0	7.2	17.7	16.2
72201	12	Z	500	29	0	5.6	13.5	12.3
72402	00	Z	500	28	0	11.4	11.9	3.4
72402	12	Z	500	31	0	9.9	11.1	5.0
74494	00	Z	500	28	0	8.6	11.3	7.3
74494	12	Z	500	29	1	8.5	8.7	2.1
78016	12	Z	500	29	0	7.8	17.6	15.7

TABLE 12

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: May 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:VECTOR WIND in m s^{-1}
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:UBIAS,VBIAS	:Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DBBH	00	V	100	2	0	0	0.0	-2.1	-3.2
DBBH	12	V	100	9	0	0	0.0	0.1	-0.4
DBLK	00	V	100	1	0	0	0.0	1.9	4.6
DBLK	12	V	100	4	0	0	0.0	-2.6	-3.4
ELML7	00	V	100	11	0	0	7.1	1.3	0.1
ELML7	12	V	100	10	1	9	2.4	3.7	-8.7
FNOR	00	V	100	13	0	0	3.7	1.7	0.7
FNOR	12	V	100	12	0	0	3.9	0.4	-0.7
FNOU	00	V	100	11	0	0	2.8	-0.2	-0.1
FNOU	12	V	100	11	0	0	3.0	1.3	0.7
FNPH	00	V	100	10	0	0	2.8	0.5	0.4
FNPH	12	V	100	10	1	9	2.9	-1.8	19.9
FNRS	00	V	100	12	0	0	4.2	-0.2	0.1
FNRS	12	V	100	11	0	0	2.5	2.0	2.1
JBOA	00	V	100	1	0	0	3.6	0.6	0.8
JGQH	00	V	100	1	0	0	4.6	-0.3	0.7
JIVB	00	V	100	1	0	0	4.1	-0.6	0.1
LDWR	00	V	100	21	0	0	4.1	-0.7	-0.5
LDWR	12	V	100	26	0	0	1.2	-0.5	-0.6
OVYA2	00	V	100	3	0	0	1.3	-0.7	1.5
OVYA2	12	V	100	2	0	0	1.3	0.1	-1.0
OXYH2	00	V	100	1	0	0	1.3	-0.5	0.6
SHIPAF	00	V	100	4	0	0	1.3	2.4	-1.5
SHIPAF	12	V	100	1	0	0	1.3	-0.7	0.2
V2XM	00	V	100	2	0	0	1.3	1.3	-2.2
V2XM	12	V	100	2	0	0	1.3	3.1	4.2
03953	00	V	100	28	0	0	2.4	-0.4	0.7
03953	12	V	100	29	0	0	1.7	-0.2	0.7
04018	00	V	100	26	0	0	1.8	-0.7	-0.8
04018	12	V	100	29	0	0	2.0	-0.5	-0.1
04220	00	V	100	4	0	0	1.6	0.8	0.2
04220	12	V	100	5	0	0	1.6	0.1	0.6
04270	00	V	100	26	0	0	1.6	-0.3	0.1
04270	12	V	100	23	0	0	2.9	-0.1	-0.8
04339	00	V	100	22	0	0	1.7	0.0	-0.9
04339	12	V	100	17	0	0	2.8	-0.8	-0.2
04360	00	V	100	26	0	0	3.1	-0.5	0.9
04360	12	V	100	29	0	0	1.9	0.0	0.1
08001	00	V	100	22	0	0	6.6	2.2	1.5
08001	12	V	100	21	0	0	3.8	-0.8	-0.8
08508	12	V	100	10	0	0	3.5	0.7	1.3
08594	00	V	100	1	0	0	2.6	-0.2	-3.7
08594	12	V	100	12	0	0	2.6	-2.2	2.5
71600	00	V	100	27	0	0	3.1	0.3	0.2
71600	12	V	100	30	0	0	2.6	0.2	-0.5
72201	00	V	100	27	0	0	2.3	1.2	-0.3
72201	12	V	100	29	0	0	3.4	0.5	-0.4
72402	00	V	100	26	0	0	3.0	0.2	0.3
72402	12	V	100	31	0	0	2.9	0.3	-0.4
74494	00	V	100	26	0	0	4.2	0.6	-0.1
74494	12	V	100	28	0	0	1.8	0.2	-0.8
78016	12	V	100	29	0	0	2.4	0.9	0.3

TABLE 13

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: May 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:500 hPa.
Element monitored		:VECTOR WIND in $m\ s^{-1}$
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:UBIAS,VBIAS:	Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
/BBH	12	V	500	1	0	0	0.0	1.5	-0.1
DBBH	00	V	500	2	0	0	0.0	-0.1	1.0
DBBH	12	V	500	11	0	0	0.0	-0.2	-2.3
DBLK	00	V	500	1	0	0	1.6	-2.3	4.1
DBLK	12	V	500	4	0	0	1.6	-0.1	-0.3
ELML7	00	V	500	16	0	0	3.4	1.1	-0.3
ELML7	12	V	500	13	0	0	2.5	-0.7	-0.3
ELMN7	00	V	500	1	0	0	3.3	-3.7	1.9
FNOR	00	V	500	15	0	6	3.3	-0.4	-1.1
FNOR	12	V	500	13	0	0	4.8	-0.9	-0.4
FNOU	00	V	500	11	0	0	3.1	0.8	1.1
FNOU	12	V	500	11	0	0	2.8	-0.5	0.9
FNPH	00	V	500	12	0	0	2.2	-1.5	-0.8
FNPH	12	V	500	13	0	0	3.4	0.4	-0.4
FNRS	00	V	500	13	0	0	3.6	0.3	-0.5
FNRS	12	V	500	11	0	0	2.3	-0.2	2.4
JBOA	00	V	500	1	0	0	3.1	0.2	-0.5
JGQH	00	V	500	1	0	0	3.0	1.2	0.5
LDWR	00	V	500	23	0	0	5.4	-0.1	-0.1
LDWR	12	V	500	25	0	0	2.5	-0.3	0.6
OVYA2	00	V	500	2	0	0	3.0	-1.1	2.6
OVYA2	12	V	500	2	0	0	3.0	-4.4	1.3
OXYH2	00	V	500	1	0	0	3.0	-0.2	0.9
SHIPAF	00	V	500	5	0	0	3.0	1.4	-4.0
SHIPAF	12	V	500	2	0	0	3.0	1.0	-2.2
V2XM	00	V	500	2	0	0	3.0	-0.8	2.0
V2XM	12	V	500	2	0	0	3.0	-1.1	-2.1
03953	00	V	500	29	0	0	2.8	0.9	-0.4
03953	12	V	500	30	0	0	2.7	0.9	0.0
04018	00	V	500	29	0	0	2.5	-0.7	0.2
04018	12	V	500	31	0	0	3.8	0.6	0.7
04220	00	V	500	28	0	0	4.2	1.7	-1.1
04220	12	V	500	29	0	3	4.4	2.2	-1.4
04270	00	V	500	27	0	0	3.7	-0.9	-0.7
04270	12	V	500	28	0	0	3.4	-0.4	-0.5
04339	00	V	500	28	0	3	3.2	1.6	0.8
04339	12	V	500	25	0	0	5.0	-0.7	-0.1
04360	00	V	500	26	0	0	3.1	0.9	-0.4
04360	12	V	500	30	0	0	2.9	0.1	-0.6
08001	00	V	500	27	0	0	3.2	-0.1	0.5
08001	12	V	500	25	0	0	3.8	1.2	-0.5
08508	12	V	500	20	0	0	3.9	0.7	0.1
08594	00	V	500	1	0	0	3.8	0.1	-4.1
08594	12	V	500	13	0	0	3.8	0.0	0.4
60020	00	V	500	23	0	0	2.3	0.7	-0.1
60020	12	V	500	26	0	3	2.7	-0.1	0.7
71600	00	V	500	27	0	0	3.4	0.3	1.0
71600	12	V	500	30	0	0	3.6	0.0	0.7
72201	00	V	500	28	0	0	3.8	1.5	-1.7
72201	12	V	500	29	0	0	3.5	-0.5	-1.5
72402	00	V	500	28	0	0	2.0	-0.2	0.3
72402	12	V	500	31	0	0	1.9	0.4	0.0
74494	00	V	500	28	0	0	3.7	0.1	0.7
74494	12	V	500	28	0	0	1.7	-0.2	0.1
78016	12	V	500	29	0	0	2.7	-0.8	0.7

APPENDIX I

1. The gross error limits for observation minus background differences of geopotential height in Tables 5, 10 and 11 are:-

Level (hPa)	Geopotential height (metres)
1000	100
850	100
700	100
500	150
400	175
300	200
250	225
200	250
150	275
100	300
70	375
50	400
30	450

The weighted RMS values used in Table 5,10 and 11 are calculated using the following weights:-

Level (hPa)	Weight
1000	3.70
850	3.40
700	2.90
500	2.20
400	1.90
300	1.60
250	1.50
200	1.37
150	1.19
100	1.00
70	0.87
50	0.80
30	0.64

2. The gross error limits for observation minus background differences of windspeed in Tables 6,12 and 13 are:-

Level (hPa)	Windspeed m s^{-1}
1000	35
850	35
700	40
500	45
400	50
300	60
250	60
200	50
150	50
100	45